AUGUST, 1951

American Engineer

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IN THIS ISSUE . . .

INDUSTRY'S REAL PROBLEM: THE BRAINPOWER SHORTAGE

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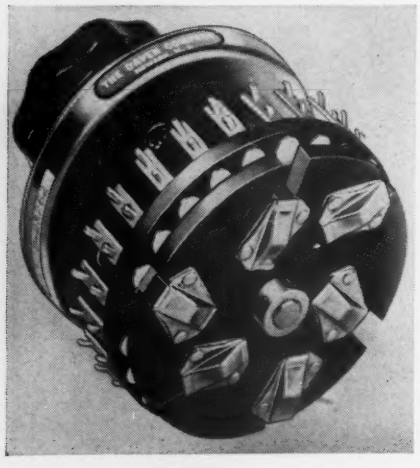
NSPE PRESIDENT L. L. DRESSER, P. E.
A New Year For New Ideas and New Progress

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
FOUNDED 1934

What's New

As a service to our readers, this column will describe briefly new product developments of general interest to professional engineers. When writing manufacturers, we will appreciate your mentioning the American Engineer.

● The Daven Company of Newark, New Jersey, announces that its long-life rotary selector switches are now available with up to 6 poles, 15 positions per pole, on each deck. This large number of poles and positions on each deck is due to the patented Daven "knee-action" type of rotor arm. Silver alloy contacts and rotor arms are used on all units.



Further information, including complete catalog data, may be obtained by writing directly to the manufacturer, the Daven Company, 191 Central Avenue, Newark 4, New Jersey.

● A recent paper by Professor Francis Bitter of M.I.T. and F. Everett Reed of Arthur D. Little, Inc., which reviews the development of an improved iron core magnet for general laboratory use, is now available from Arthur D. Little, Inc., of Cambridge, Massachusetts.

The paper presents design considerations and operating characteristics (with curves) for a research electromagnet having a wide range of application. Basic details of construction are outlined, operating data at the 20 KW power input level are given.

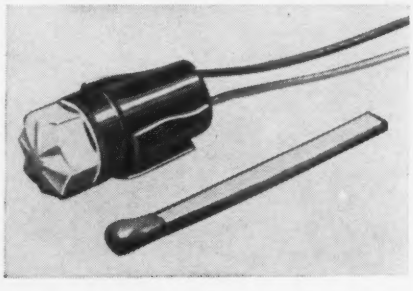
Reprints of the Bitter-Reed paper will be supplied without obligation. Requests for the paper should be addressed to: Arthur D. Little, Inc., 30 Memorial Drive, Cambridge 42, Massachusetts. Att: Mr. Herbert H. Howell, Mechanical Division.

● An improved air and water pressure washer, known as the Hydro-Air Pressure Washer, is announced by D. & M. Products, Inc. The Pressure Washer connects directly to ordinary air and hot or cold water supply outlets and is capable of delivering either a powerful force of "cold steam" or a fine spray that penetrates the smallest cavities.

Reports indicate that through the use of Hydro-Air Washer, water consumption is reduced by one-third.

The Hydro-Air Pressure Washer is chrome-plated, revolver-shaped, and fits into the palm of the hand. For further information write to D. & M. Products, Inc., 30 North Raymond Avenue, Pasadena 1, California.

● A new miniaturized indicator light, believed to be the smallest on the market, is announced by Alden Products Company, Brockton, Massachusetts. This ultra-compact, brilliant, 6 volt light gives a sharp indication that can be viewed from any angle.



Bulky screw machine parts are entirely eliminated—the tiny light is only ¾" in overall length and less than ⅜" in diameter. The functional design permits easy mounting on panel without complicated tools or processes . . . simply pushes into an "S" drill hole. It can be mounted in extremely close proximity.

Removing or replacing bulb is no problem—simply unscrew the crystal shaped lens and you remove the bulb. Furnished with leads to any length, this light fits into standard production assembly techniques. For further information, write Alden Products Company, 117 North Main Street, Brockton 64, Massachusetts.

● Condensed technical information valuable to engineers associated with problems involving the design, fabrication and use of tubing used in elevating temperature and high pressure applications is contained in a new six-page bulletin offered by the Babcock & Wilcox Tube Company.

Known as Technical Bulletin 12F, it contains such information as analyses, physical and mechanical properties, creep strength, short time elevated temperature tensile strength, and oxidation resistance of 14 of the more popular tubing steels. Included are data on carbon, intermediate chrome molybdenum and stainless steels used in high temperature, high pressure service.

Copies of Technical Bulletin 12F are available free on request to the company's offices at Beaver Falls, Pennsylvania.

● A revolutionary pocket-size pH meter and companion probe unit, now available for the first time, permit instant, on-the-spot pH determinations anywhere.

Completely self-contained with batteries, in a bakelite case 3" x 5⅞" x 2½", this instrument is furnished, camera fashion, in an ever-ready case with novel plastic tubes of buffer and KCl solutions. Total weight is 3 pounds.

Elimination of "grab samples" and trips to the laboratory by the ever-ready features of this new Pocket pH Meter and Probe Unit, open new fields for "on-the-spot" pH control. Further details are available from Analytical Measurements, Inc., 585 Main Street, Chatham, New Jersey.

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"If there was no grand design in the beginning of the universe, fragments of one are now evident, and mankind can complete the picture. A knowledge of the good life is our certain philosophic heritage, and technology has given us a power over nature which enables us to provide the conditions of the good life for all the earth's multitudes."

—CHARLES A. BEARD,
Noted Historian.

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EDITORIALS

The Beginning . . .

The Society has launched its public relations program. From the germ of an idea back in 1949 that resulted in a survey of the Society's public relations needs by experts in the field, the desire for such an activity has grown. The program, as outlined in a booklet recently sent to members, and reviewed briefly on page 21 of this issue, is really based on the strong platform of service to industry. This seems to be a proper approach for a professional organization.

When the program is completed, the reports that come out of it should line the library shelves of thousands of industrialists and engineers in this country. It is hoped by the Society and its Professional Engineers Conference Board for Industry, that for some years to come the reference pieces will be considered valuable additions to engineering literature, and will thereby remain living symbols of engineering-management cooperation.

The program will do the Society, the profession, and industry much good. If it is conducted on the high plane of service, as it most surely will be, there is little doubt that the benefits to industry and the profession, will be felt by all concerned. The first step, then, is now being taken. As the entire story is summed up in the booklet mentioned above, "The engineering profession can advance . . . NSPE makes certain it does!"

Ready For Fall . . .

August is the ideal month for Chapters to become organized for the winter months of increased activity. Plans should be laid now to assure Chapter programs with a fresh approach. Remaining summer days can well be utilized to formulate publicity ideas, to plan for increased membership, and to formulate methods of being of greater service to your community.

The State Societies stand ready to assist the Chapters in their programs, and National Headquarters, of course, is equally ready to help. For program ideas and other hints on successful Chapter functions, Chapters should make certain they receive the Public Relations News-Letter, which is published monthly during the winter months. This publication is available from Headquarters.

Advance activity planning will pay off in dividends of greater present and potential member interest.

We Welcome The Ladies . . .

This month Mr. Paul H. Robbins, P. E., NSPE's Executive Director will appear on the CBS radio show, "Adventures In Science." With him on the program will be Miss Beatrice Hicks, P. E., president of the Society of Women Engineers, and the subject to be discussed will be the opportunities for women in the engineering profession.

Engineers Robbins and Hicks will point out that the present desperate shortage of people trained in engineering continues to grow, and the need for personnel demands that more women come into the profession. "America's superiority in the world, both in standard of living and military-wise is based on technical manpower," believes Miss Hicks, who is Vice President and Chief Engineer of Newark Controls, Bloomfield, New Jersey. "Modern living with its expanded technological aspects requires many more technically trained persons than at any time in history. Today, women are working in all phases of engineering."

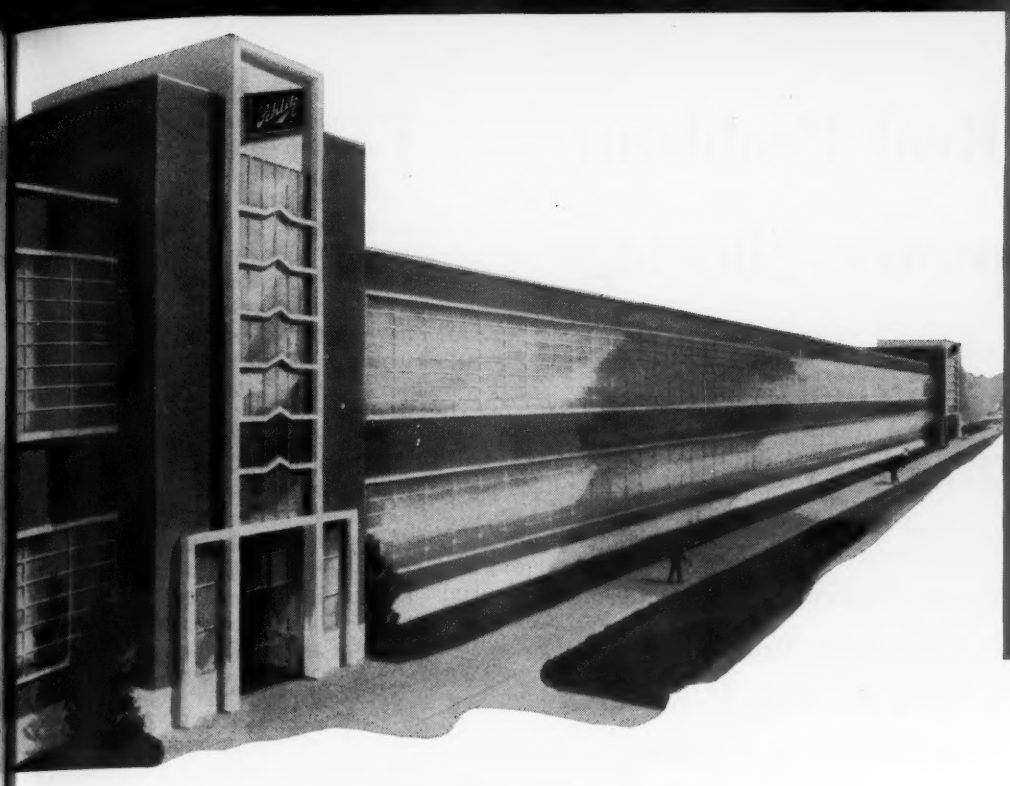
The engineering profession, long an inhabitant of "no-woman's land," extends a hand of welcome to its feminine counterparts and wishes sincerely that their stay will not be as temporary as one might hope the present emergency to be.

The Special Issue . . .

As announced elsewhere in this issue, the September AMERICAN ENGINEER will be a colorful publication with its editorial material woven around the defense theme. Some months in preparation, the enlarged magazine will present to its professional engineer readers articles by outstanding Americans and engineers. It will be an issue to be studied and enjoyed.

The special National Defense issue was designed primarily to give regular AMERICAN ENGINEER readers more in valuable editorial material, but even more important, it is hoped it will evolve into a greater professional publication that will belong to *every* engineer as a voice interpreting life as a professional man in today's world.

A leading advertising executive recently described the engineering profession as one of the "most influential groups in the country." Such a group needs a really excellent journal to carry its voice to all—effectively and with dignity.



We'd Like to Have You Meet . . .

Lawrence E. Peterson

Member, Wisconsin Society . . . Internationally prominent consulting engineer . . . Former NSPE Vice-President . . . Astronomy enthusiast . . . NSPE's representative at 1st International Congress of Civil Engineering . . . and Photography Fan . . .

THIS issue we'd like to introduce Lawrence E. Peterson, P. E., member of the Wisconsin Society, who is well known throughout America and abroad for his work in various fields of engineering science and practice. Interested in engineering from boyhood, he has been at his chosen profession since 1920, when he was graduated from the University of Illinois with a degree in Civil Engineering.

His first professional affiliation was with the Kalman Company of Chicago. After a short time with reinforcing steel companies in Toledo and Chicago he helped to organize in May of 1927 the Osthoff-Peterson Company, Consulting Engineers, in Milwaukee. In 1932 he purchased this firm and changed its name to Lawrence E. Peterson, Consulting Engineer. In 1946 his company became Lawrence Peterson and Associates, Consulting Engineers, with offices in New York and Milwaukee.

Over the years the firm's services have broadened until they include almost every conceivable type of structure. For instance, the company acted as Consulting Engineers for some of the world's largest malt houses for the Fleischmann Malting Company, a part of Standard Brands Corporation. Its activities have spread to other countries as well and it numbers among its engineering projects two malt plants for the "Bavaria" Company in Central and Southern Colombia, South America.

Included also are some of the largest breweries in the world—the Schlitz Brewing Company and the Miller Brewing Company, both in Milwaukee. The water filtration plant at Naples, Florida, is another of the concern's jobs as are the Malt Plant, office building and research laboratory for the Kurth Malting Company.

In telling of amusing experiences on engineering projects, Peterson says, "In 1945 I designed some malt houses in Colombia, South America and immediately gained the improper title 'Senor Doctor Peterson' by men in that country who used methods and masonry measurements as varied as the many localities and elevations, quite a 'charming' departure from the conventions of our country."

Photography and Astronomy have been Peterson's foremost hobbies for some years now, and his interest in the astronomical field prompted him to lead an expedition to study the total eclipse of the sun at God's Lake, Manitoba, Canada in 1945. In addition, he visited several astronomical observatories in South America in 1946 and 1948.

Some of his professional and civic activities include: Director of Wisconsin Division of the American Automobile Association; Member of Greater Milwaukee Committee; Member of the Wisconsin and National Societies; Member of the Milwaukee and State of Wisconsin Building Code Committees; and membership in the American Institute of Consulting Engineers, the American Society of Civil Engineers, and the Society of American Military Engineers. He is also a member of the University Clubs of New York, Chicago, and Milwaukee.

In advising young engineers about the future, Peterson says, "I believe perseverance—stick to the job until you finish it—stands high among the list of virtues which dignify our profession and I think young engineers should be increasingly conscious of it."

This issue, then, we introduce Lawrence E. Peterson, P. E.—a man of whom his Society and Profession may well be proud.

Industry's Real Problem: The Brainpower Shortage

By Don G. Mitchell, President
Sylvania Electric Products, Inc.

Is the Professional Engineer Properly Trained to Meet Industry's Needs? Is He Being Properly Utilized? An Honest Inquiry Into These Questions May Help to Alleviate America's Critical Shortage of Engineers

Expanded American production is the free world's ace in the hole against Communistic aggression.

It would be presumptuous of me to offer you statistics on the engineering manpower situation. I am sure you must know by heart how many engineers were graduated last year and this year, and how many are in each of the classes now in college. You know how representatives of industry have swarmed on the campuses desperately trying to sign up engineers at attractive starting rates. Every graduate either has been placed or can be placed, once he makes up his mind which bid he will accept. Aside from the fact that some of these young men will not return from their tour of duty with the Armed Forces, it must be a comfortable feeling for our educators to know that as they start on the finishing of next year's model none of the last is left over in stock.

It is not as comfortable for industry. As you well know, there are not enough engineers to go around. We are trying to maintain a civilian economy at the same time that national defense requirements are increasing and use of critical materials is being restricted. This is a problem that needs engineers and more engineers, but the defense services also need engineers.

This isn't anything new. We have had national emergencies before. When shortages developed we either learned how to get along with what we had or we turned to some substitute source. Sometimes the necessity has brought practices that have been beneficial long after the emergency has passed. Such a situation could develop in the employment of engineering manpower.

Perhaps we can draw some comparisons between engineering and some of the skilled trades. At one time a machinist had to spend six or seven years learning his trade. When he became a journeyman he could make up the work and operate any machine tool. Mass production industry, however, couldn't wait as long as that to train machine mechanics. Men were trained for special work in a fraction of the time it took for the overall training.

It seems to me that we have been giving thousands and thousands of young men a four year training in the fundamentals of engineering, at considerable expense to them, and then putting a great many of them in jobs that could be done as well by people with a fraction of the training.

(EDITOR'S NOTE: *This article was adapted from a speech given by Mr. Mitchell on July 26 before the American Society of Engineering Education at its Summer Meeting.*)

For a long time, engineers were poorly paid by comparison with college trained men in other professions. Supply and demand had, of course, more than a little to do with it, **but an important factor was the type of work they were doing.** Even so, I am none too sure that industry did not pay more to engineers for doing that kind of work than it would have had to pay to non-college trained people.

How many engineers are hunched up over a drafting board on mechanical work? How many are compiling statistics and drawing graphs? How many are playing nurse to ailing machines? How many are making routine tests? How many are caught in blind alleys doing specialized work that requires no particular talent?

In other words, do we have a shortage of engineers or does it just look that way because of the manner in which we have put engineers to work? Would we have a shortage of engineers if we replaced them with people trained to do some of these routine jobs on which engineers are now being used?

Obviously, I am speaking generally because, of course, there are many men who succeed in getting an engineering degree who will never be able to go beyond routine work. People so mentally limited would probably enjoy life more if they never had gone to college. The old adage that "it is better to have loved and lost than never to have loved at all" frequently hides an awful lot of heartache and bitterness. If what I am suggesting could happen, actually does come to pass, I believe that industry, engineers and education will all benefit.

Let me ask you who should do the original selecting and the basic training, if it is fair to leave the responsibility for ultimate determination of an engineer's employment entirely to industry? That, I know, is an academic question and we could argue it all night long and get nowhere. Nevertheless, I think you will agree that industry has a point when it says that every time it is saddled with a frustrated individual it acquires a possible point of social infection.

Probably the greatest gain would come through a reevaluation of the formal training of engineers in the light of what industry really wanted. This is a subject which has been discussed so much that there should be little left to say. Nevertheless, I am sure that if industry finds it can fill advantageously the routine jobs with people who are not engineering graduates, our engineering schools and industry will find it necessary to reappraise the quality of the formal training.

Just why do we need engineers in industry? One could answer by enumerating the different kinds of jobs in which engineers are employed, which is what industry does in its recruiting college work. If what I have been saying, however, has any validity this approach would offer us no constructive solution to the problem of engineering manpower adequacy. Instead, I am going to discuss the larger aspect of our need.

Of first importance today is the creation of a sound national defense that will protect us and the other free nations of the world from the spread of aggression by Communist countries. Without the United States the rest of the world is doomed. Europe is too weak from the last war to resist. Asia has no defenses worth mentioning, nor has South America.

What do we have that makes us so sure of ourselves? It isn't our natural resources of metals, fuels, forest, soil and water, for the opposition has these in abundance and, as we deplete our own reserves, we find ourselves more and more dependent on others.

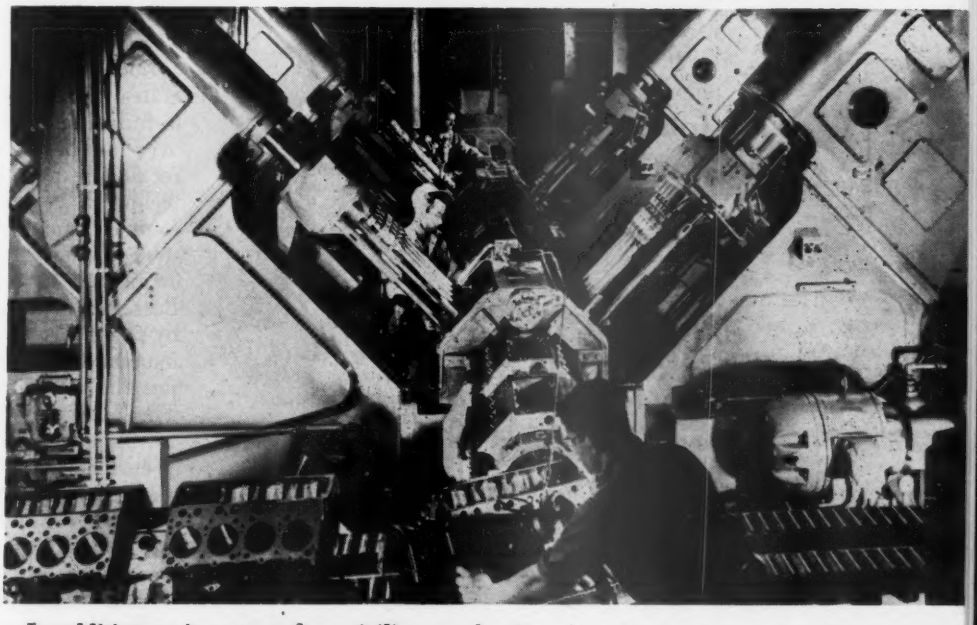
Nor is it our population of one hundred and fifty million people. The nations within the Russian orbit greatly outnumber in population the peoples of the free nations.

Our physical superiority lies in our creative and productive abilities—broadly in the field of engineering.

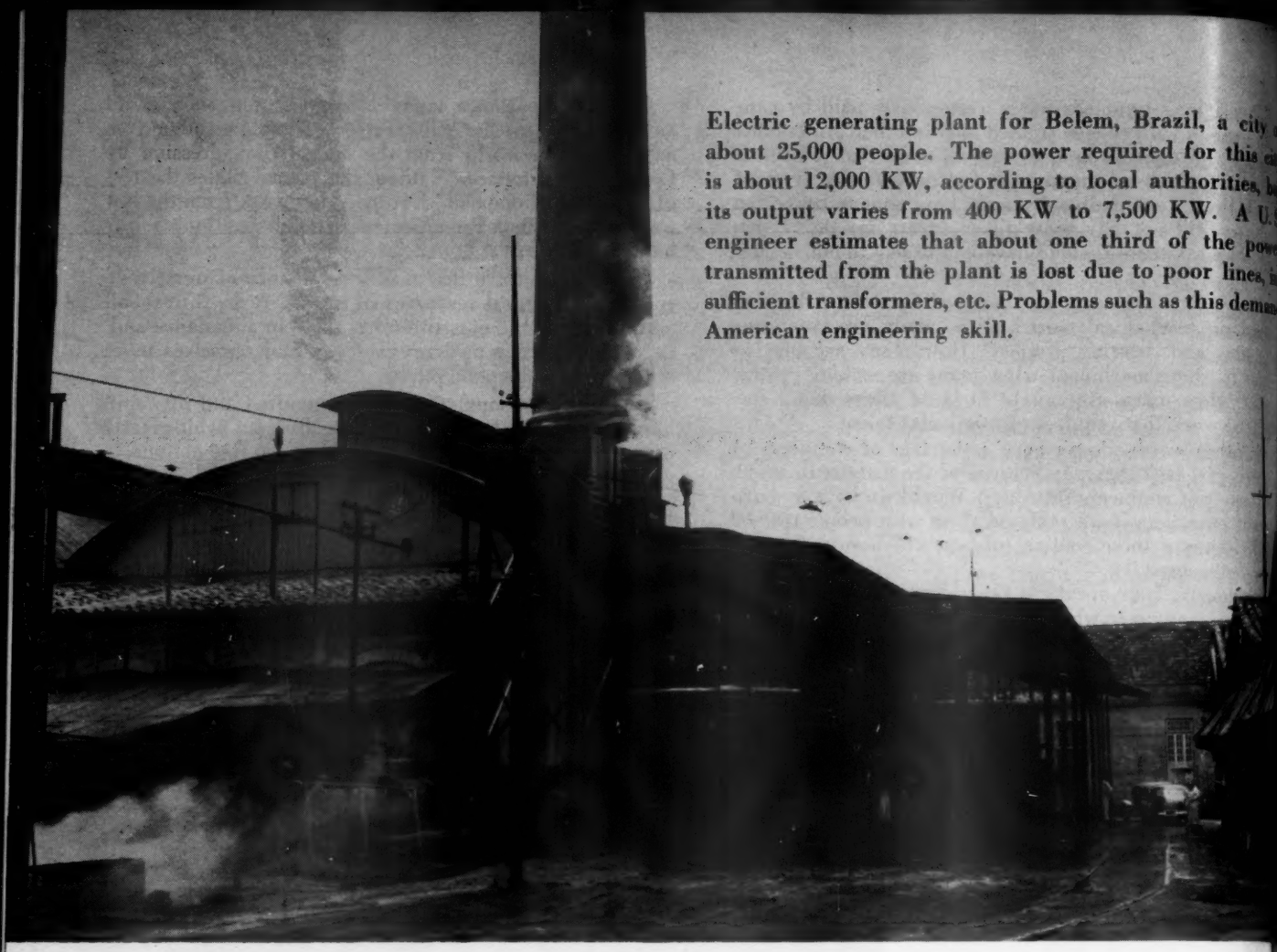
The United States has two things which have defied competition from the rest of the world—two things which we call by different names but which are as inseparable as Siamese twins. I refer to our worker productivity and to our standard of living. Without a high productivity there could be no high standard of living and

(*Continued on page* 31)

Do we have a shortage of engineers, or is industry utilizing them correctly?



In addition to its tremendous civilian production, America must now gear for defense, also. This means more engineers.



Electric generating plant for Belem, Brazil, a city of about 25,000 people. The power required for this city is about 12,000 KW, according to local authorities, but its output varies from 400 KW to 7,500 KW. A U.S. engineer estimates that about one third of the power transmitted from the plant is lost due to poor lines, insufficient transformers, etc. Problems such as this demand American engineering skill.

Pt. 4 Without Government

By

John Molloy, P. E.

Vice President, Armco International Corporation

Member, Ohio Society

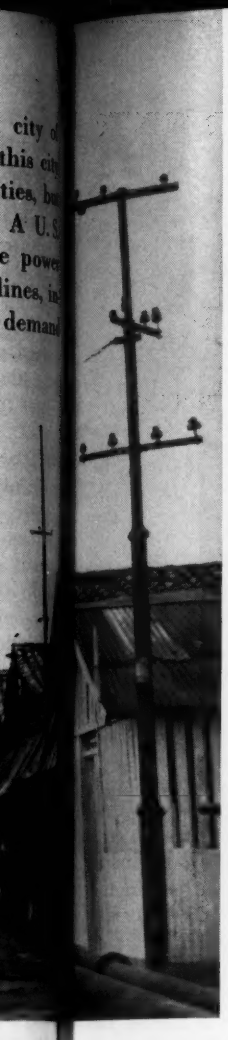
Read what can be done, with advantages, by American engineering firms, in the field of foreign technical assistance. Here are some suggestions as to how American Industry can best serve itself and its neighbors abroad.

We Americans have become world conscious, although it has taken us two World Wars plus terrific drains on our collective pocketbooks to awaken us, and many of us still instinctively resent the facts if we let only our emotions govern our actions.

We don't necessarily disapprove of the idea of helping to rebuild Europe or helping to develop backward economies, but we do dislike the idea of spending our money just to insure a bottle of milk a day to everyone in the world without their doing anything to earn it.

Looking back into our own history, we of the United States were glad to get financial and engineering and technical help from abroad on a substantial basis for well over one hundred years after we became a nation. If we recall our past history, many, if not most, of the basic technical developments on which our industries are founded came to us from overseas. In the field of iron and steel alone practically all the fundamental techniques originated in Great Britain, France and Germany—the Bessemer process, the Siemens-Martin open hearth process, by-product coke plants, rolling techniques, stainless steel, manganese steel, silicon alloy steels for the electrical industries, to name but a few—came to us from overseas. The McKinley Tariff permitted quick development of a tin plate industry in this country, but we had to import Welsh tin plate operators to make the move a commercial success. The same thing is undoubtedly true in many of our other industries. And many of our railroads, our mines and other industries also relied heavily on European investors for financial assistance even as late as World War I.

So if we are now giving, or considering giving, our advanced techniques in many fields of construction, man-



ufacturing and even in sales to other countries, we are to some extent repaying an old moral obligation and to some extent extending to, say, Latin America and Africa the same helping hand we received when our country was younger.

Of course, in those early days all the financial aid and the technical aid was between private parties. Governments, as such, were not involved. In my personal opinion, this is the best basis on which Americans can work abroad, and our own company has been doing this type of technical work abroad since 1913, long before Point 4 was ever thought of in government circles.

If a deal is made between private parties covering manufacturing techniques or consulation work, the buyer will try to get full value for his expenditure and the seller will not give his shirt away if he can help it, and in most cases both parties benefit. When the deal is from government to government, it seems to be human nature to lose considerable of the value through necessary bureaucratic friction and inertia.

For some years to come there undoubtedly will be many government to government dealings which necessarily affect engineering and consultation work abroad, so our efforts can only be directed to see that these dealings are confined to those fields where they most properly belong, such as advice on road building and transport. health facilities and the like. The other fields should, wherever possible, be left to us as individuals or as companies to deal with.

One of our big advantages and a major reason why we have made so much technical progress in the last fifty years has been our big domestic market, plus our relative freedom from government interference. This has permitted us to build up a fund of specialized knowledge and production techniques, many of which could be used abroad to the advantage of both parties.

In Europe the populations and local markets have been limited. Tariffs between countries have created interference, the wage scales have been much lower than in this country, so that the working man has not been a large factor in consumer markets and there has been less of a competitive spirit within industry—all of this tending to slow down their rate of economic progress.

In the newer countries the emphasis has been on the production of foodstuffs and of raw materials to be exchanged for consumer goods or capital equipment from the United States or from Europe. The development of improved communications, both in transport and radio, has opened the eyes of these newer countries to the possibility of doing many of these basic operations for themselves.

Two World Wars cut off their export markets and in many cases nearly ruined their national economies for the duration of the wars because of the lack of steel and machinery to keep a minimum economy going. This has made both governments and individuals alike determined that they do not want to go through this experience a third time, so almost all of the newer countries, whether they have the raw materials resources or the local markets to justify a plant or not, want a steel industry or a paper industry or some other industry. We undoubtedly would react the same under these circumstances.

Our company can appreciate these points, and where we have felt the fundamental long-range conditions were sound, we have agreed to help establish modern plants during the postwar period or to work with these plants on a technical consultation basis. We are at present working with companies in Great Britain, Belgium, France, Italy, South Africa, Mexico and Argentina.

What has this meant to us in the way of changes in markets or sales volume? We have been doing this type of work for nearly forty years and have never been able to measure its effect on our markets either directly or indirectly. In other words, our sales volume from the United States into the territories where we have given technical service has not decreased because of that service. True enough, our volume has been affected from time to time, but it has been due to exchange difficulties or tariff difficulties rather than because of economic factors. Where we haven't encountered exchange and tariff considerations, our sales volume has tended to increase.

Because of the large American market and our ready acceptance of new ideas, there is sufficient time lag between developments here and abroad that overseas operators cannot technically keep fully abreast of American improvements. And even in those cases where they might approach or use our techniques, wage standards have tended to improve and the United States then has the possibility of selling more of American production in other forms, such as automobiles, refrigerators, radios, etc., into the export markets.

Except in the case of very specialized activities, Europe does not offer us the best field for large scale engineering and construction activities. The newer countries—say, Latin America, Africa and eventually the Far East—are better potential customers.

What conditions do we find there? Most of these countries have not yet developed a strong middle class. Instead, we have the very rich and the very poor, and frequently a short supply of labor and also of capital. The philosophy of many of the rich is to speculate in real estate or other fields in which they hope to get a high quick profit. The same attitude obtains when they do invest in manufacturing ventures. If they can earn 100% on their investment per year, the venture looks good, otherwise why take a risk for the future? A change in business philosophy in many of these countries cannot be accomplished overnight. It will take years, maybe generations. On the other hand, we find strong national prides and resistance to the idea of using foreign capital, at least where it would have a major voice in local policy decisions.

We have found it good business to deal with all these groups on the basis of equality, even though we realize and they realize that they do not have as complete an understanding of practical engineering and manufacturing techniques as might be desired. Once they understand the full implications of a problem, they do get things done, although it takes longer to do than in this country.

We cannot generalize too much in considering these countries because each of them has its own local problems: some are highly literate and some are down the scale of literacy; some have excellent raw materials resources and an intelligent working class, and others may be the opposite.

When dealing on the basis of an engineering or a

General view of the harbor at Fortaleza, Brazil. The State of Ceara and the city have spent millions of dollars in projects to improve this port but are not willing to spend more until they get technicians to direct the proper use of funds.

technical consultation contract, there are several factors which must be carefully considered.

Many of the countries have local laws regarding foreigners' practicing the engineering profession within the boundaries of the country, and this factor must not be overlooked in negotiating a contract where a number of American engineers are involved.

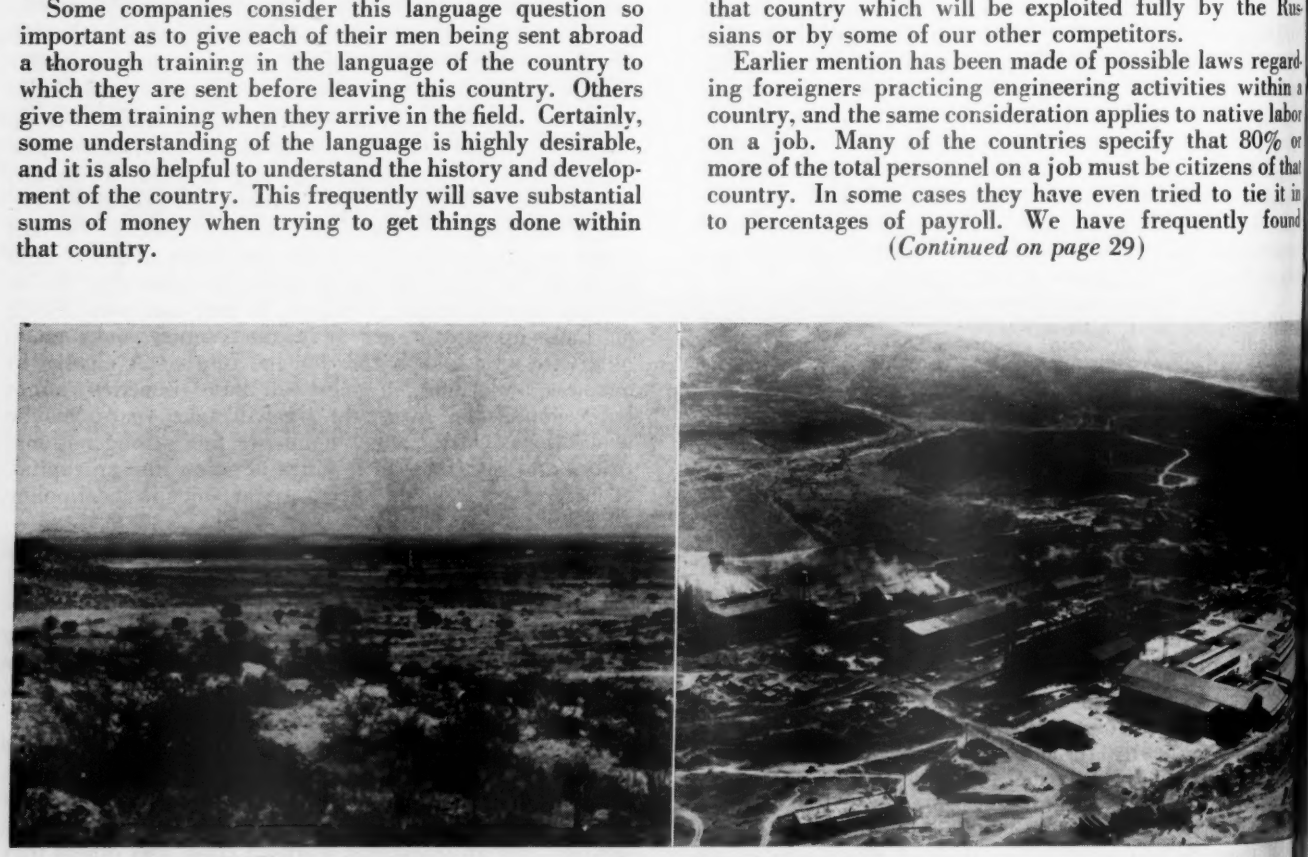
We, of course, are usually faced with the language problem as well as with mensuration system differences in working abroad. The latter is not serious and the additional conversion cost can be readily calculated.

Some companies consider this language question so important as to give each of their men being sent abroad a thorough training in the language of the country to which they are sent before leaving this country. Others give them training when they arrive in the field. Certainly, some understanding of the language is highly desirable, and it is also helpful to understand the history and development of the country. This frequently will save substantial sums of money when trying to get things done within that country.

If the engineering and technical work abroad deals with licensing to manufacture under patents within that country or by use of specialized know-how not covered by patents, it is advisable that the American company give some thought to the market possibilities within the territory. As discussed earlier, many of these overseas markets are restricted outlets due to the fact that they have little or no middle class and the working class is poorly paid. If we help someone install a plant and attempt to produce for a non-existent market, there is almost immediately an unfavorable reaction against Americans in that country which will be exploited fully by the Russians or by some of our other competitors.

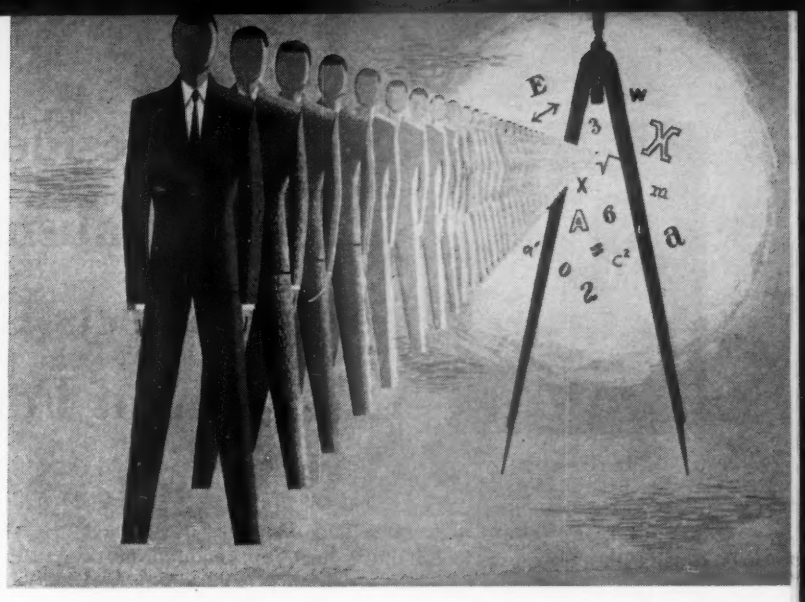
Earlier mention has been made of possible laws regarding foreigners practicing engineering activities within a country, and the same consideration applies to native labor on a job. Many of the countries specify that 80% or more of the total personnel on a job must be citizens of that country. In some cases they have even tried to tie it in to percentages of payroll. We have frequently found

(*Continued on page 29*)



These pictures show one example of American engineering skill. The view at left shows the plant site of Altos Hornos De Mexico before construction was begun by the Armco International Corporation. The finished plant, which manufactures fabricated products, cast iron pipe, plates, tinplate, etc., is shown on the right.

A Program For Progress



By John W. Mason, P. E.

Member, Pennsylvania SPE

THIS question of "how should the engineer be educated" will probably result in a different answer from every person asked and probably all answers have their merit. However, to answer it properly from a constructive standpoint, the further questions of "what is expected of him and what is wrong with present techniques" should be investigated.

A survey of the positions available to the engineer would include the following as examples of the more popular fields: design, sales, service, maintenance, installation of equipment, teaching, technical writing, consulting, advertising and management.

Of the above group, how many are presented to undergraduates? A check of students in engineering schools indicates that design or teaching is what is foremost in their minds although, when questioned about such fields as listed above, a desire for more information is apparent. This, together with analysis of recent articles on shortage of engineers, educations, etc., indicates that our educators have not sufficiently acquainted students and prospective students with what our profession has to offer.

I know several young men now in high school who had no desire to be engineers because they did not want to design bridges, build roads, teach school and the like. But, when they were told of the many fields available to engineering graduates, they expressed a desire for more information relative to an engineering education. From this it appears that we may be at fault in our advertising and counseling programs for attracting students to our profession.

After the student has enrolled in engineering, what should be his curricula for the next four or five years? This question has been attacked from all sides and angles in recent years and has provided subject matter for many papers. One group seems to favor more cultural studies, another more basic science, another specialization, and so on. It is evident that something should be done but as yet there seems to be no coordinated action on the part of the educators. It appears basic that an engineering curriculum be established that most nearly meets the requirements of the employers employing engineers. Such a program does not appear to exist in the undergraduate school.

To plan an educational program properly it is important to analyze what is expected of the cadet engineer with a Bachelor of Science or Engineering Degree. There are few industrial or utility companies who would be so venturesome as to hire a graduate right out of school and immediately assign him the task of designing a substation, a chemical plant, or give him an order book and send him out to sell technical equipment. Most employers like to train their employees in their way of doing things and give specialized training in selected fields. Months and even years are therefore often invested in a new engineer before he is given such responsibility. In some cases specialty courses and special talents are recognized by employers and the cadet engineer is assigned responsibility for projects but in the majority of cases it is assumed (and probably rightly so) that he has the ability to learn but actually knows little about his profession and hence should go through a thorough company training program.

Even with today's trends toward specialization, there seems to be more need for engineers to have a good general background. Electrical engineers, for example, in the application of electrical equipment are often faced with mechanical and chemical problems.

Under these conditions, it does not seem out of line to recommend a greater consolidation of courses for engineering students. It seems logical that undergraduate study should include more general and cultural studies with good coverage of the basic sciences, together with a job counseling program that would bring to the attention of the student all of the many different vocations that are available, with their qualifications, merits, etc. For those who want to specialize, the graduate school is available, where specialization can be carried out to the desire of the individual whether he has just graduated from the undergraduate school or is returning to school from industry for additional education.

A program of this nature would streamline our engineering schools and pave the way for more and better graduate work. Industry could then train the graduate to his and their best advantage. The result should be a more capable and better educated individual than is developed under the present educational system.

Educators and industry personnel training men should cooperate to develop such an educational program. It is within the power of these two groups to mould the engineer to the best advantage of the individual and of industry. Certainly, closer cooperation of these groups together with pre-college counseling should succeed in attracting more men to our profession—the profession that is expanding so rapidly in the current industrial, atomic and military world.

Mr. Dresser

Society President Calls For True Professionalism To Help Accomplish Aims; Selects Committees As First Assignment For New Term

Your many letters, telegrams and messages of support during the past few weeks have been appreciated more than it is possible to express. This support has been backed by a keen willingness and a sincere desire to be of service in accepting assignments to committee work. I thank every one for so graciously accepting the tasks assigned.

The undertaking of appointing committee members, one of the first duties of an incoming President, is one of considerable proportions and to be able to attain the completion of this arduous duty within the first two weeks of the new administrative year is most encouraging to your official family. We wish space were available so that the membership could read the responses received from committeemen advising that they were most happy to serve and that it would be a pleasure to assist the committee work.

We can now look forward to a successful year ahead with a feeling that the membership from every locality is ready and willing to serve in the promotion of the welfare of our Society. I shall make every effort during my term of office to visit each State at least once in order to glean an even fuller appreciation of the fine work being done.

Taken as a whole, the committee membership comprises our "working force." Their conclusions determine to a large extent the road we take. To accomplish the maximum results they will welcome your constructive suggestions as individual members, and it is urged that you exercise your privilege of offering assistance by recommending actions to the Chairmen and the members of the committees.

Too few realize the many hours of toil and study that are required to complete these assignments, many of which are continuing with new horizons being established each year. You, as a member, can lighten their tasks and speed up their work, with the end result that the National Society will attain greater accomplishments in service to the Nation and to the profession.

One of our most pressing problems is to bring into our Society the many thousands of registered engineers who must be encouraged to realize that they are professional men, recognized as such by the laws of their respective states. Professionalism means much more than just complying with registration laws. Each of us, in becoming registered, accepts the responsibility of being a public servant and of protecting the public by ethical practice. The public looks to us for safety, economy, and improved conveniences, as well as guidance and assistance in community affairs.

The constructive services of the Chapters to their communities will accomplish much in enlisting their registered engineers to join with us in assisting or taking leadership in the many civic affairs that are before us, especially at this time when the civil defense program is being implemented. Our possibilities for public service are unlimited. One thing is assured: employers and clients will take justifiable pride in knowing that they are associated with an engineer who is contributing to the public welfare. If we can only realize the value of organized public service we can obtain the interest, friendship, appreciation and good will of those we seek to impress.

It is my sincere desire that the NSPE will continue to build its program of constructive service, for through such a program will we become creative and effective. Then we will be truly Professional Engineers.

Sincerely,
L. L. DRESSER, P.E.

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(*Continued on page 34*)

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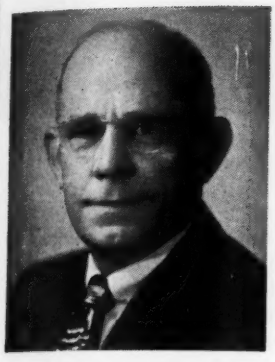

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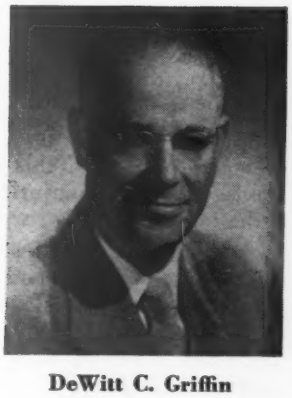

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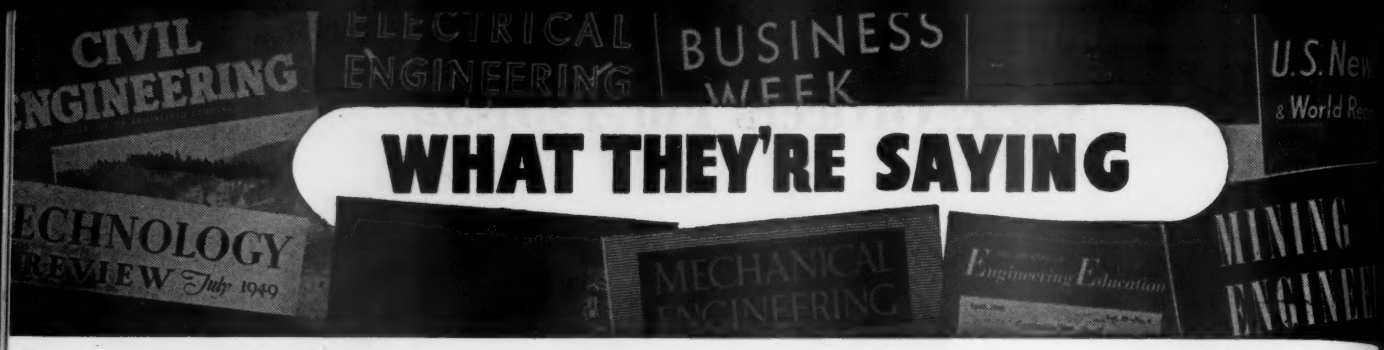


RATION AND RADIATION

Our experience in recent test programs repeatedly has demonstrated that radiation hazards will not delay rescue and recovery work after an air burst of an atomic bomb. There is no reason why every casualty can not be removed and treated immediately without serious radiation hazard to rescuers.

In the case of a high aerial burst of an atomic weapon, such as I think will probably be used, there would be no residual radiation. In a low air burst just above the ground's surface, the significant residual radiation would be confined to an area 300 to 400 yards in radius. No rescue work would be required in this area because it would be devastated. Rescuers outside of this area would not be subjected to injurious ionizing radiation in reaching survivors.

At Eniwetok, for instance, large numbers of scientists and technicians returned to the test islands as quickly as transportation by air and water permitted to recover their instruments and data needed for their research. On one of the islands where new construction was required, full time work started 1,000 yards from the detonation point on the day of the explosion and within the 72 hours required to build barracks, the workers occupied their quarters. There was residual radiation in an area immediately around the detonation point because the detonations were made from towers.

Radiation safety surveys made after the tests in the immediate area of Eniwetok Atoll and neighboring inhabited atolls failed to reveal any contamination of a serious nature. Food and drinking water outside the destroyed area continued to be fit for human consumption.

The immediate radiation hazards from the air burst disappears after the first two minutes. Rescue, fire fighting and recovery work can begin immediately in any area where there is life, the same as in any major catastrophe caused by conventional air attacks, earthquakes or disasters on the scale of those at Texas City and Halifax. — *Brigadier General James Cooney, Radiation Safety Adviser to Joint Task Force Three. From a press conference held jointly by the U. S. Atomic Energy Commission and the Department of Defense concerning the atomic tests at Eniwetok, at the Pentagon on June* 13, 1951.

A GUIDING LAMP

The period in which we have been living since 1914 appears like a vast social crisis, similar to the great upheavals which, in the light of modern history, are known under the name of the Reformation and the French Revolution.

At the root of this overthrow of social structures and conception of life, the engineer and the technical sciences appear as fundamental factors. Because of his technical ability, the engineer may be considered sometimes as the promoter of new ideas, source of material progress, but also of social and economical conflicts, sometimes as a result of this technical civilization.

The evolution of economical system both in the 19th century and during the present time, have caused the neglect of the social problem. Considered as a byproduct of economic necessities, these problems have not been placed at the top of the list of the difficulties to be solved by those in authority.

If the engineer's role in the technical progress cannot be disputed, his action in the formation of social structures adapted to this highly technical life appears less clearly. One of the difficulties comes, no doubt, from the imperfect conception of "Engineer." Already in the same country one hears under this name very different functions: technical design and research, the development of manufacturing processes, and of the organization of labor, commercial and economical functions, without mentioning the different phases of technical sciences, mechanical, electrical, chemical, public works, etc. . . . If we attempt to define the signification of "engineer" in the different countries, the definitions become still more vague and varied. However, it seems that there is a common characteristic to all engineers: they all have the function to know and to control material things in order to put them at the service of man.

They all have the feeling that the action of the engineer should not be restricted to the technical field but should extend to the social activities that are closely associated with them. To clarify the action of the engineer towards this goal seems to be a first duty. Since the engineer has to subdue his action to an overall perspective giving a meaning to the elaboration of the new civilization rising before our eyes, recourse to a higher order becomes a necessity. The Christian has an accurate conception of this ideal. Faith, an interpretation of life extending beyond it and enhalting the individual, shows him the way.—*From a news release of the First International Congress of Catholic Engineers, which was held in a suburb of Paris on July* 20, 21 *and* 22, 1951.

MILITARY ENGINEERING TODAY

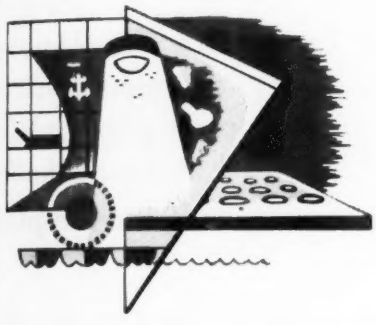
From our earliest days, engineers —or their counterparts in practice if not in name—have literally paved the way for many of our military achievements. They include the men who built the bateaux for Rodgers' Rangers during the French and Indian War. They were the men who built the earth-works at Bunker Hill. They were the men who fashioned the defenses of New Orleans behind which Andrew Jackson won his crucial victory in the War of 1812. They were the men who first developed, in the field of naval construction, the iron-clad ship.

It is the exploits of the engineers which have made possible many of the great advances and rendered successful the necessary strategic withdrawals on the battlegrounds of Korea. The amount of time and material and the number of lives the

saved have contributed greatly to the effectiveness of our forces.

The modern engineer is the heart of our military power, whether his specialty is ship design, construction, lay-out, road building, construction of fortifications, the erection of wharves and docks, demolition, planning of emergency lighting, tank-farm layout, camouflage or the countless other requirements which the engineer is technically trained to meet.

Today, Navy engineers share with Army and Air Force engineers, a variety of problems. They work together in the development of atomic weapons and upon the use of atomic energy for ship and rocket propulsion. They search together for answers to new problems in the light of lessons learned jointly and separately from the experience of World War II, and from developments in the current struggle now being waged in the Far East.



The well-publicized motto of the Navy Seabees, "Can Do," applies today to engineering elements of all the Armed Forces. Just as there are not enough other types of specialists in our Armed Forces, there are not enough engineers and not enough engineering equipment and supplies for many of the jobs which have to be done. Yet, somehow, in a way known only to engineers, the essential engineering tasks will be accomplished when they are needed. That is the spirit of accomplishment against all odds which has not only made America great, but which keeps her vibrant with promise of an ever-greater future. It is this spirit which will afford great blessings when we become able to apply it exclusively to the peaceful and benevolent purposes to which we are instinctively dedicated as a nation.—*Francis P. Matthews, Ex-Secretary of the Navy. Military Engineering, July-August,* 1951.

QUESTIONS FOR TOMORROW

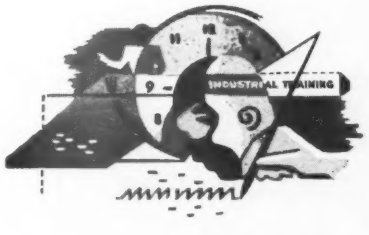
What more important qualification could a young engineer have, in starting his professional career, than the ability to get things done? Of course there is no substitute for sound theoretical and practical training during the college undergraduate and graduate learning periods. With the strides that have been made in technical progress, it is becoming more and more difficult to prepare for a future job in a given amount of time without almost knowing in advance what the job is to be. A greater burden is being placed on the educators responsible for selecting the material for the courses. In spite of their continued efforts, there are many dislocations during the first few years of employment. Therefore, the thoughtful student will make the most of his generalized training, realizing full well that the first demand from his first employer might be far removed from his specialized field. In fact, his entire career might successfully be in some branch of engineering for which he has had very little formal preparation.

Let us therefore analyze the problem to determine what demands are placed upon the engineer by an efficiently functioning organization. First of all, he must find practical solutions to new unsolved, problems. Before even starting to solve them he must be able to organize his thinking. He must have a clearly established procedure for determining what has to be done, how it will be done, who will do it, and when it must be done.

Assuming for the moment that his thinking has been organized and that he has arrived at a method of attack, he must now proceed with the doing of it. How much specific training is given to the undergraduate or graduate student in how to work with himself and in how to work with others? Let me ask the primary question with which we are concerned here and which I think can be answered by any of us who have a completed formal engineering education: Are engineering graduates prepared for their jobs? I believe the answer will be a definite "no."

I propose that a college or university, which is interested in preparing its students along the lines we have discussed, take the initiative of sponsoring a committee of responsible engineering executives of proved ability from representative industries. The function of the committee would be to review existing courses for adequacy and method of approach, to formulate new courses, which might be called "Industrial Training" courses, designed to prepare the student for his job and to write the necessary textbooks covering the material for these new courses. The courses should be given equal emphasis with others in the regular technical training curriculum. If necessary, room should be made by dropping less essential, supplementary courses designed to "round out" the student. An alternative plan could provide for summer sessions to cover the enlarged program.

The Industrial Training courses must have certain features to make them successful. They must be crammed with specific practical examples drawn from industry, some of them perhaps adapted to daily campus life. Maintenance of a high degree of interest on the part of the student is essential. A few specific examples are worth thousands of words of abstract generalization. The courses must be reviewed periodically and revised where required to meet changing needs. The committee must, therefore, maintain itself active, rotate its chairmanship, and acquire new members. It is desirable, I believe, to have some steering by the faculty. However, this should be minimized until plans are fairly well formulated to avoid the danger of losing a valuable fresh approach. The student angle should also be obtained at some time during the formulation period.



The answer to the question of who should give the Industrial Training courses comes rather steadily. It seems clear that to derive the maximum advantage from the program, the courses should be presented by the various representatives from industry, who have helped in some way to formulate the courses. It should not be difficult to find fifteen or twenty engineers in responsible supervisory positions who would be willing to devote, say, a total of four hours of classroom time each per year on a

(*Continued on page* 30)

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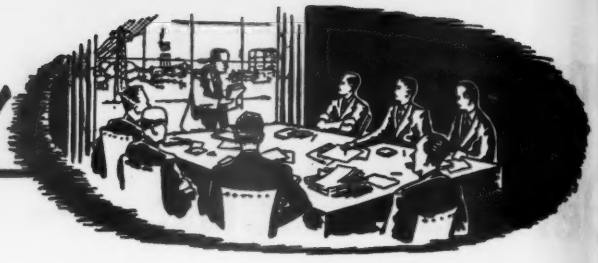
Accent on Activity



THE NEW PUBLIC RELATIONS PROGRAM IS OFF TO A FAST START . . . Mailing has gone to **ALL MEMBERS** (See page 21) and very early returns **SHOW TOP INTEREST . . .** Many are sending in contributions with return of Questionnaire-Report labels . . . **AT PRESS TIME (Remember, these are early returns) THE COUNT WAS: 654 requesting Questionnaires and $1,016.20 MORE FOR THE GROWING FUND . . . TOTAL COLLECTED TO DATE: OVER $29,000.**

NSPE ON CBS NATIONAL HOOKUP . . . Executive Director Paul H. Robbins and Miss Beatrice Hicks, president, Society of Women Engineers, will appear August 18 on 15-minute CBS show **(Nearly 100 local stations)** called "Adventures In Science." The two Society heads will talk about women in engineering.

IF YOU ARE ENTITLED TO RECEIVE the Professional Engineers Auto Plaque as offered to contributors of $5 or more to PR fund, **YOU SHOULD HAVE YOURS BY AUGUST 15 . . . IF NOT, contact National Headquarters at once . . . Plaques are once more in supply.**

SEPTEMBER ISSUE OF AMERICAN ENGINEER TO BE A SPECIAL NATIONAL DEFENSE ISSUE . . . DON'T MISS IT . . . Show it to your employer or others interested in the profession . . . It will be colorful, double-size, and filled with articles by **BIG NAMES OF INDUSTRY AND GOVERNMENT . . .** See pages 18-19 for gift coupons . . . AE Editor, Executive Director, and Society Vice President George J. Nicastro, held recent confab in NYC with Advertising Rep to plan fall advertising solicitation program . . . **SPECIAL ISSUE TO BE PART OF PROGRAM.**

UP ON CAPITOL HILL . . . Members of a special committee on Procedures for the Selection and Compensation of Architects and Engineers (made up of NSPE, AIA and ASCE members) held conference with **REPRESENTATIVES OF ARMED SERVICES** on subject of the committee.

Decals of the Professional Engineers insigne will be available near the END OF AUGUST at a nominal cost . . . watch for an announcement. Decals may be used on glass, etc.

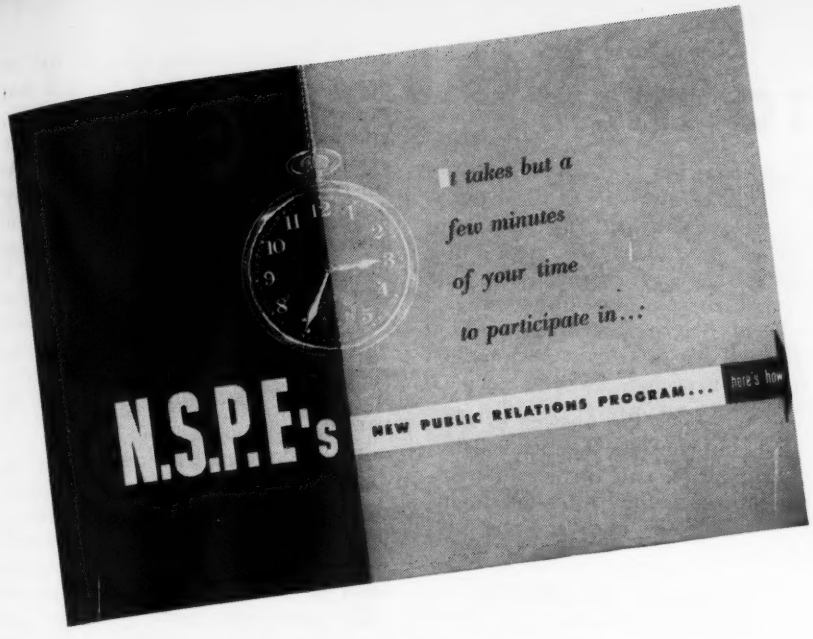
WITH SOCIETY OFFICIALS . . . Vice President **T. C. Forrest, Jr.,** Chairman, Budget Committee, visits Washington office on committee work . . . **Past Presidents A. G. Stanford and Alex Van Praag, Jr.,** at NSPE Hqs as members of Procedures for the Selection and Compensation of Architects and Engineers group visiting government officials.

IT IS NOT TOO EARLY TO START THINKING ABOUT ENGINEERS' WEEK, 1952 . . . Many on-the-ball **CHAPTER AND STATE** groups are already at work on the observance . . . Plans now call for **SPECIAL PROMOTIONAL KIT TO BE OUT IN OCTOBER . . .**Local officials are urged to **APPOINT A COMMITTEE NOW TO GET THINGS STARTED.**

MORE AND MORE PUBLICATIONS are being distributed to the field . . . Booklet to encourage better meetings was well accepted by officials . . . More officials call for membership material in **PREPARATION FOR FALL MEMBERSHIP CAMPAIGNS . . .** Requests for reprints from the **American Engineer** increase—**ANY ARTICLE WILL BE REPRINTED.**

Summary of action at Minnesota meeting distributed to Chapter officials . . . MEMBERS SHOULD SEE OFFICIALS FOR SUMMARIES OR WRITE DIRECTLY TO NSPE HQS.

ON THE AIRLANES WITH NEW PRESIDENT L. L. DRESSER . . . The 1951-52 chief executive will fly own plane to **Alabama Society** meeting, then to **West Virginia Society** meeting at White Sulphur Springs, August 24-25 . . . Before that, attended **North Carolina Society** meeting at Atlantic Beach, N. C., August 3-4.



The attractive brochure shown left is NSPE's first step in its new Public Relations Program, and was mailed out recently to the membership to urge their cooperation in the program. It tells all about the questionnaires which are going to be submitted to leading industrialists, and how NSPE members can assist in the project.

Booklet Inviting Participation In Public Relations Program Goes To NSPE Members

A COLORFUL and informative booklet has been sent to all Society members explaining how the new public relations program will function and how the individual member can participate in it.

As the booklet points out, NSPE's public relations program is to be conducted as a research project on current engineering-management problems. In effect, it will establish a "clearinghouse" for the two-way exchange of information and ideas, and is to be conducted with the guidance of an NSPE advisory group, the Professional Engineers Conference Board for Industry. The members of this Board are now being selected, and the names will be announced soon.

In operation, this Board, working with appropriate Society officials, will screen and advise on the contents of the topics selected for research survey questionnaires dealing with subjects of current major interest such as . . .

"How To Improve Engineering-Management Communication"

"How Better To Use Engineering Talent"

"How To Attract Qualified Engineers"

"How To Train Engineers In Industry"

The first questionnaire will be on the subject of "How To Improve Engineering-Management Communication," Society members were informed. Through NSPE headquarters, state societies, chapters, and individual members, this questionnaire will be distributed to representative employers of engineers, seeking their experience and viewpoints. The questionnaire will be designed for either interview fill-in by the NSPE member, or to be written out and returned by the employer. It will seek information, experience and viewpoints by means of "yes" and "no" answers, subjective comments, and requests for descriptive material on the topic involved.

Authoritative reports on the subjects studied will be provided participants in the survey, after the information from the questionnaire is pooled and organized. They will contain (a) the survey information, supplemented by (b) material developed from studies of existing references, and (c) the Society's special knowledge of its fields of interest.

The recent mailing gave instructions to the member on how to receive the first questionnaire and later the report. Replies from the membership are presently being received at a fast rate and if early indications are borne out, a substantial number of NSPE's 25,000 members will take part in the program.

"After studying the booklet, we feel you will want to contribute to keep the program going," Mr. C. G. Roush, Chairman, Public Relations Committee, told Society members. "We as engineers have long been aware of the lack of recognition for our profession that is so necessary to our welfare, and our new program is a direct result of this awareness."

"The thought and effort of many members of the Society, as well as that of an outstanding public relations consulting firm, have gone into the preparation of this program. It is easy for you to become a part of the program, and we trust you will make every effort to do so."

$28,000 Raised

The announcement of the details of the program is the end result of a drive for funds to carry out a public relations program that was first authorized by the NSPE Board of Directors at the Annual Meeting in June, 1950. Two requests for support since that time have netted $28,000.

"Approximately 15% of our members have responded to fund raising solicitations mailed to all members. We think we have sufficient money to make an effective start, although the more money we have the longer the program can be continued," Roush went on to say.

"We hope you will contribute now if you have not previously done so. If you cannot contribute in money at this time, however, you can still participate in this program as outlined in the booklet," Roush said. "The important thing is to take part in this important activity in some way."

TO THE Editor

Brotherhood . . .

Dear Editor:

Thank you very much for an excellent article on the Kings County Chapter Installation. I am sure it will go a long way towards fostering the Brotherhood of Man, something which I hope will be an example to other professions.

PAUL KLEPPER, P.E.,
Business Manager,
Kings County Professional Engineer,
Brooklyn, N. Y.

More on Titles . . .

Dear Editor:

The letter of Will D. Sampson, P. E. to "The Editor" printed in the June issue of the AMERICAN ENGINEER deserves some thought and consideration.

I think that we will all have to agree that the use of the term "Engineer" has deteriorated through the years and is now generally applied to one's self by anyone wishing to convey to the public the idea that he possesses some talent in any occupation. Its use no longer indicates special knowledge and application of mathematics and the physical sciences.

Some states are now using the term "Professional Engineer" in their registration laws in an effort to separate the meaning between the two terms. This long term is, however, not being used in general conversation and therefore is not gaining the desired distinction it should.

I do agree with Engineer Sampson that a new word is necessary but doubt if "Doctor" is the answer, since that term indicates the possession of a Doctor's Degree. All Engineers who have a "Doctor's" degree do use Doctor. Possibly we should require all registrants to have a Doctor's degree, but our present educational requirements for Engineers is too obsolete for this and would have to be overhauled.

I do not have the answer to this question, but consider the idea worthy of consideration and further thought on the subject by the Profession might bring up some new ideas and possibly a solution.

JAMES E. HASTAIN, P.E.,
Phoenix, Arizona

Cheers For Remp . . .

Dear Editor:

Allow me to add an "Amen" to the remarks of George E. Remp, P. E. of Gainesville, Florida. He has, indeed, pointed out the professional man's most serious defections regarding true citizenship. His letter in the July issue should be thoughtfully read by all engineers.

Another thought for engineers comes from the continual effort to tamper with the education of technical men. Many people feel that the continuing propaganda for "humanizing" technical education is aimed at the actual education of each individual to become a cog in a preconceived social order. This is in direct opposition to the development of useful skills and individual potentials, the educational concept which has created our technological civilization with its freedom, social advancement, and ever-rising standard of living.

GEORGE C. BARNES, JR., P.E.,
Blacksburg, Virginia

Response to Sporn . . .

Dear Editor:

It is about time that somebody said a few of the things put forward by Engineer Sporn of the American Gas and Electric Company in your June issue. . . .

The engineer is the man in modern civilization who conducts the ideation that is required to alter the environment so as to free the consciousness for accelerated progress in the environment. Sometimes he conducts it backwards. The engineer, for example, has presided at the rite of denuding the planet of the soil that is essential to the life of the ecology, and has near brought the formal side of the evolution to a dead stop. At least, he has today come within a few decades of it. But the engineer will also right the matter. Thinking has progressed to where the trouble is seen, and more chemical and material soil will integrate around the revised, and more successful, ideation being sparked by the notion of "conservation," and the situation will be reversed.

What is puzzling Engineer Sporn, and has so reduced him to generalities, I believe, is what is puzzling a lot of other well-meaning folks who wish to assist the evolution. When you wish to formulate ideas, mathematically, you must have terms and expressions commensurate with the ideas. If the ideas have a number of dimensions, you cannot well, or even recognizably, express them in formulae using only one dimension. Mathematics basically uses four dimensions. The three directions of formal space, with the idea of succession, or time, through which these directions, and solidities constructed in them, may progress. Philosophy and speculation use what is at times a bewildering variety of basic yardsticks, apparently totally unrelated to anything, even each other. One of these socially accepted criteria is summed up when we say Money. This dimension is used to measure production, reward, achievement, political power, productive capacity and many other facts of life and progress in the evolution, each and every one of which has many *other dimensions* in addition to its mere money-equivalent!

Perhaps right here is a big part of what Engineer Sporn is feeling around for. When he wants engineers better trained, more widely educated, what he really has in mind is that the engineer must be given, and trained to use, the *other* dimensions of his production problems, in *addition* to the mere money-expression of them. . . .

HENRY D. HAMMOND, P.E.,
New York, N. Y.

Dangerous is it to wake the lion
Pernicious is the tiger's tooth
But the most dreadful of all terrors
That is man in his illusion.

—Schiller

BOOK LOOKS

Title: The Failure of Technology.
Author: Friedrich Georg Juenger.
Published by: Henry Regnery Company, Chicago. Price: $2.75.

The Failure of Technology was written during the short space of a few months in 1939. However, the general tenor of the book is more of a warning than a creative happiness. Juenger was aware that he must use the short time available to him to write before the world became involved in war. Once the work was finished, however, it had to be hidden from the Nazis, and could only be published some six years later.

The message of this book is summed up very well in the introduction, by H. Bleibtreu, which says, "The urge for perfection, as the author sees it, stems from the technician's rational, factual, utilitarian, and impersonal way of thinking, which leaves but little room for moral and cultural considerations. . . . The drive for technical perfection is a self-impelled and irreversible process, which, if left to itself, must end in a completely regimented and mechanized society that lives in a state of exhaustion, both of natural and of human reserves."

For the ultimate notion of right is that which tends to the universal good; and when one's acting in a certain manner has this tendency he has a right thus to act.
—Frances Hutcheson

It is then pointed out that exploitation of nature brings forth scarcity. Scarcity drives us on to further perfection and the depletion of our natural resources. This, in turn, leads us into still more scarcity, more economic instability and more regimentation. In this unbalanced social and economic situation we face the ever-present danger of a war in which all technical productive effort is devoted to destruction.

The book itself is written in a rather philosophical vein, and the author explores the various theories of social science and progress in which the world now believes.

Many facets of the technological problem are explored in this excellent work, such as the distribution of poverty, the delusion of the saving of labor, the pillage of the earth, the myth of exact science, and the perversion of freedom. This last chapter is particularly interesting, as the author compares the mechanical causality assumed by today's scientists and technicians with the predeterminism of certain religious dogmas. He points out that free will exists in neither case, nor is it possible. "For he who assumes that man possesses free will is forced to assert indeterminate determination or equality of intention, which leaves unexplained how any decision is ever reached. Such complete equality must lead to a paralysis of the will, by which all decision ceases, because the two sides of the scale on which decision is weighed are in perfect equilibrium."

No man can mortgage his injustice as a pawn for his fidelity.
—Edmund Burke

The Failure of Technology is a thoughtful work, rather than an exhortation. The reader feels that Juenger was genuinely concerned about this problem, and his work is more than a warning, although some of his statements concerning the development of atomic power now read like a prophecy.

As a man engaged in the furtherance of technology, you are the reader for which the book appears to have been originally intended. Perhaps you will have a healthy disagreement with Juenger on many points, but you will certainly find that the book presents a challenging and stimulating argument.—B. W. H.

Title: Hospitals — Integrated Design.
Author: Isadore Rosenfield.
Published by: Reinhold Publishing Co., New York. Price: $15.00.

This book makes every effort to integrate the latest available information on hospital design with concomitant information on hospital needs and related facilities. Architectural considerations are given with a view to the peculiar problems of a hospital. In addition to general information on hospital construction, details are given for the planning of such hospitals as those for cancer, tuberculosis, psychiatric and chronic diseases.

This revised text is generally followed with illustrations of over 500 plans and photographs.—B. W. H.

OUR AUTHORS

John Molloy, P. E., (Point Four Without Government — page 8), is a member of the Ohio Society and Vice President of the Armco International Corporation. He was graduated from the University of Cincinnati in 1923 with a degree in Chemical Engineering.

Upon graduation he worked for the Armco Steel Corporation on metallurgical assignments in the Middletown Division until 1928. He was transferred to the Armco International Corporation in 1928 as Technical Adviser.

He became Chief Metallurgist in 1934, Technical Director in 1937, and is now Vice President and Director of the Technical Division for the corporation.

Don G. Mitchell (Industry's Real Problem: The Brainpower Shortage—page 6), has been President of Sylvania Electric Products, Inc., since 1946. Only 41 years old when elected to that position, he had already achieved recognition for himself as an outstanding sales executive.

He has taken a prominent part in industry association work as a member of the board of directors of National Association of Manufacturers, American Management Association, National Electrical Manufacturers Association, and National Sales Executives.

He is a director of the following corporations: Sylvania Electric Products, Inc.; Nylok Corporation; General Time Corporation; Thorn Electrical Industries Limited, London, England; and the First National Bank and Trust Company of Summit, New Jersey.

Around The Nation With Our Members

Illinois Chapter Conducts Pollen Survey As Public Service

The Civic Affairs Committee of the Capital Chapter, Illinois Society, is conducting an air pollution survey of Springfield, Illinois throughout the "hay fever season" until the first frost. Five stations have been set up at which samples will be collected daily.

Each of the stations is located where the public can see it, and each bears a descriptive tag informing the public that Springfield's professional engineers are engaged in an air pollution study.

In order to supplement the collection of samples and aid in its interpretation, the Committee has also sent out a questionnaire to be filled out by individual hay fever victims.

Delaware Officers

Pictured above at the recent Delaware annual meeting are: J. L. Bahr, Past President (left) and C. H. Evans, Delaware President for 1951-52.

Delaware Society Holds First Annual Meeting Recently

The Delaware Society held its first Annual Meeting recently at the Hob Tea Room in Wilmington, Delaware. It was the first Annual Meeting of the Society and also its first "Ladies' Night."

The main speaker of the evening was Dr. Joseph B. Quig, Manager of the Development Section of the Technical Division, Fibers Department of the du Pont Company. His subject was "New Synthetic Textile Fibers of Du Pont."

A report of the election of new officers was presented and they are: President, Clarence H. Evans; Senior Vice-President, Ernest S. Van Demark; Vice-President, Roy A. Garbett; Secretary, Martin J. Bergen; Treasurer, Andrew L. Bolton; Director. Colonel William A. McWilliams; Director, Leo Blumberg; and National Director, Thomas B. Evans.

Past Presidents Certificate Presentation

Retiring Minnesota Society President Gordon E. Bodien, (left) presents M. H. Peterson, Past President, MSPE, with a certificate at a recent meeting of the Society which was held in Minneapolis to honor its 12 Past Presidents.

Midwestern Chapter Of Pennsylvania Holds Gala Meeting

The Midwestern Chapter of the Pennsylvania Society met on July 7 at Punxsutawney for an interesting meeting which included many activities, and was sponsored by Punxsutawney Chamber of Commerce.

The day began with golf at the Punxsutawney Country Club, and a guided tour of industrial plants in the area was held at 2 in the afternoon.

In the evening dinner was served in the main ballroom of the Elks Club. Souvenirs of Punxsutawney were presented to the members, and entertainment was arranged for the after-dinner hour.

The following guests were invited by the Chamber of Commerce Committee to attend the meeting: Honorable Robert E. Morris, President Judge of Jefferson County; Honorable George Crissman, Burgess of Punxsutawney; Mr. Samuel Jordan, President, Chamber of Commerce; Mr. Harry Batistini, President of the Punxsutawney Country Club.

Ohio Society Sponsors Marker For Historical Locks

On June 17, a ceremony at Lockington, Shelby County, Ohio, officially opened to the public the remains of the monumental stone locks. Once an important link in the Miami and Erie Canal, the locks are now cleared of all debris and marked with informative guide posts, recalling memories of a colorful era now past, and of early engineering skill in Ohio.

To Ohio Society members Arch Robison, P. E., Merrill Weed, P. E., and Jack Melvin, P. E., the ceremony marked the realization of a dream. Much of their time over a period of years was devoted to promoting the OSPE sponsored Lockington marker. Through their efforts, the O. S. P. E. Committee for the Preservation of Historic Engineering Works was set up. The report of this Committee was brought to the attention of Richard Lawwill, director of the Anthony Wayne Parkway Board. The project was established, and the plans were prepared, including the cooperation of the Ohio Department of Public Works, the state agency that manages the canals; the Department of Highways; the Shelby County Historical Society; the new Division of Parks; and other interested groups, including the Ohio Society.

To Mr. J. Richard Lawwill and the Anthony Wayne Parkway Board, the dedication marked the completion of the first project undertaken by the Board. The accomplished work helped them to establish a pattern of cooperation between state, local, and private organizations working together for a common purpose.

Three to four hundred persons witnessed the ceremonies and viewed the locks, when the ceremonies were held. Addresses and speakers for the program included: "The Miami and Erie Canal—Its Effect on the History of Ohio," S. O. Linzell, Director, Ohio Department of Public Works; "The Effect of the Canal on the Local Community," E. J. Griffis, President, Shelby County Historical Society; "The Canal—A Monument to the Engineering Profession," Edward Larson, P. E., President of the Ohio Society; and "The Canal and the Anthony Wayne Parkway," J. Richard Lawwill, Director, Anthony Wayne Parkway Board.

A man should endeavor to be as pliant as a reed, yet as hard as cedar-wood.

—Talmud

Ohio Marks the Spot

MIAMI and ERIE CANAL
Governor Clinton of New York broke ground for the canal on July 21, 1825 just below Middletown. Built in sections, the canal was opened from the Ohio River to Lake Erie in 1845. It was 249.4 miles long, rose to a summit at Loramie of 512 feet above the Ohio River level, and included 19 aqueducts, 3 guard locks, 105 lift locks, and 3 reservoirs. In 1851, at the peak of operation, there were about 400 boats on the canal. Navigation began November 28, 1827 and ended officially in 1872 although operation continued through the early 1900's. Coming of the railroads signaled its decline. The Miami and Erie Canal provided western Ohio with badly needed transportation and waterpower and was instrumental in welding the state together politically and economically. It was an outstanding example of early engineering skill.
(See Reverse Side)

Examining the marker which was placed at the old canal locks at Lockington, Shelby County, Ohio, recently are (left) Lloyd A. Chacey, Executive Secretary of the Ohio Society and J. Richard Lawwill, director of the Anthony Wayne Parkway Board. The marker was designed by the Wayne Board and financed by the Ohio Society.

Jardine Of North Dakota SPE Appointed To Registration Board

The Honorable Norman Brunsdale, Governor of North Dakota, recently announced the appointment of John B. Jardine, P.E., as a member of the State Board of Registration for Professional Engineers in North Dakota.

Mr. Jardine will serve a six-year term.

Jardine has formerly served as State President of the North Dakota Society and also as National Director. In accepting the appointment, Jardine replaced E. L. Lium, P.E., who was also a State President of the NDSPE. Mr. Lium declined the nomination for a second term on the Professional Board, continuing the precedent for one-term membership.

Galveston Chapter Recommends Members For Civil Defense Posts

G. M. Brady, P.E., President of the Galveston County Chapter of the Texas Society, has recommended S. B. Schapiro, P.E., and Allen Gilbert, P.E., for the posts of Director and Co-Director respectively of the Public Service Branch of the Civil Defense Organization for Galveston County.

This recommendation went forward in a letter to Colonel George D. Murphy (Ret.) Director of Civilian Defense for Galveston County, on June 21, and was in a response to a request made of the Galveston County Chapter by Colonel Murphy at the May meeting of the Chapter. Schapiro and Gilbert are both members of the Galveston County Chapter, TSPE.

Officials and Board Members At Annual Meeting

Pictured above are members of the Executive Committee and the Board of Directors as they attended NSPE's Annual Meeting in Minneapolis in June. Several guests are also included in the picture. The officers are, left to right, as follows: *First row:* C. A. Lichtenberg, Indiana, Vice President, Central Area; C. L. Emerson, Georgia, Vice President, Southeastern Area; Alex Van Praag, Jr., Illinois, Past President; John D. Coleman, Ohio, Vice President, Central Area; Earl Holm, California, Vice President, Western Area; J. A. H. Henderson, President, Dominion Council of Professional Engineers; S. L. Stolte, Minnesota, President, NSPE; L. L. Dresser, Oklahoma, President-elect, NSPE; A. G. Stanford, Georgia, Past President; R. B. Allen, Maryland, Treasurer; C. C. Roush, Missouri, Vice President, North Central Area; G. J. Nicastro, New York, Vice President, Northeastern Area; R. G. Warner, President NCSBEE. *Second row:* Clarence Shoch, Chairman, NSPE Legislative Committee; R. A. Blackburn, Pennsylvania; C. M. Gilt, New York; J. B. Butler, Missouri; Alberto Hernandez, Puerto Rico, President and Acting Director, Puerto Rico SPE; R. C. Clark, Wisconsin, President and Acting Director, WSPE; J. H. Powers, District of Columbia, President and Acting Director, DCSPE; O. C. Mayer, Idaho; W. A. Oliver, Illinois; H. G. Kennedy, West Virginia; J. F. Reynolds, Florida; R. K. Rouse, South Carolina R. J. Rhinehart, Arkansas; W. W. Bergerson, Washington; A. J. Ryan, Colorado. *Third row:* George Teskey, North Dakota; E. B. Robertson, Texas; O. H. Hall, Michigan; M. C. Peterson, Minnesota; C. S. Worley, Oklahoma; S. H. Hawkins, Colorado, President; Professional Engineers of Colorado; T. B. Evans, Delaware; W. G. Johnson, Kansas; E. H. Wickland, New Jersey; L. K. McKee, New Jersey; Professor F. W. Edwards, Illinois, Member, Education Committee, NSPE; Charles Molineaux, New York, President and Acting Director, NYSSPE. *Fourth row:* J. M. Fjeld, North Carolina; W. H. Emerson, South Dakota, South Dakota Society of Engineers and Architects; O. W. Turpin, Maryland; C. C. Huskison, Arizona, President and Acting Director, Arizona SPE; R. J. Merrill, Tennessee, Alternate Director, Tennessee SPE; George Clark, Ohio, Past President, OSPE; Robert Millard, Nevada, President, Nevada SPE; Oliver Deatsch, California; G. E. Bodien, Minnesota, Past President, Minnesota SPE; Unidentified; T. S. Thompson, Minnesota; Dean Wilson, Missouri, President, Missouri SPE; A. R. Losh, New Mexico; H. H. Munger, Kansas, Member, KSPE; L. W. Peterson, Alabama; T. C. Forrest, Jr., Texas; A. Mather, Rhode Island.

Appalachian Chapter Of West Virginia Hears Speaker

The Appalachian Chapter of the West Virginia Society met on July 9 at the El Chico Cafe in Beckley to hear featured speaker Fred Meyers discuss "Investment Securities."

An inspection trip to the new Raleigh County Airport followed by a picnic dinner is planned for the meeting of August 13.

Tulsa Chapter Meets To Discuss Unity Plans

The Tulsa Chapter of the Oklahoma Society met on June 27 at the Michaelis Cafeteria in Tulsa to discuss proposed plans for unifying the engineering profession.

Members of the Chapter had previously studied the various proposals which had been advanced, and at this meeting presented the various plans for the consideration of the Chapter.

Blue Water Chapter Of Michigan Society Holds Annual Meeting

The Annual Meeting of the Blue Water Chapter of the Michigan Society was held at the Algonquin Hotel in Port Huron on June 27. Featured speakers for the evening were Michigan President A. F. Plant, who discussed problems and plans for the future of the Society, and Mr. George Taak, district supervisor of the Michigan State Department of Conservation at Imlay City.

Mr. Taak gave a talk on the work of the Conservation Department with particular emphasis on reducing fire losses in the woods and building up of the tourist business in the area.

The following officers were elected for the 1951-52 term: President, Allen T. Carlisle; Vice President, Glen A. Whitmore; Secretary-Treasurer, Howard L. Canfield; State Director, Lehmann M. Dunn. MSPE President Plant presented the new officers with N.S.P.E. lapel buttons.

The meeting was concluded with the showing of two movies, one dealing with fire losses and the other showing tourist attractions in Michigan.

RECEIVES SERVICE AWARD

Charles R. Waters, P.E.

Waters Of NYSSPE Honored By Buffalo Paper For Service

Charles R. Waters, P.E., who was one of the original organizers of the Erie County Chapter of the New York State Society, and the first President of that Chapter, was honored by the *Buffalo Evening News* some months ago by being selected by that newspaper as one of twelve outstanding citizens for public service in the Buffalo area for the year 1950. The newspaper account reads as follows: "As district engineer for the New York State Department of Public Works, Mr. Waters has been extremely foresighted. He was instrumental during the year in bringing about action for many long-needed state projects to improve Buffalo's physical position. These projects include the Main-Humboldt underpass, High Level Bridge, and the widening of Hamburg Turnpike."

Waters, who was the only engineer selected from among the twelve, assisted in the early activities that led to the placing of the engineer's licensing law on the statute books of New York State.

Mr. Waters has had a long career in field construction, and in administrative management, and executive engineering positions. He is a graduate of Union College, and has been District Engineer in Buffalo for twenty-five years.

He is the author of many published articles on highway construction and traffic engineering subjects. He is a member of the Institute of Traffic Engineers, the National Society and several local and professional societies.

Stein Of PSPE Elected To Leeds And Northrup Post

I. Melville Stein, P.E., member of the Pennsylvania Society, was recently elected to the newly created post of Executive Vice-President of the Leeds & Northrup Company of Philadelphia. Mr. Stein has been a vice-president, and is Director of Research.

Before joining Leeds & Northrup, Stein was a personal assistant to Thomas A. Edison during the first World War, when the inventor was Chairman of the Naval Advisory Board.

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Wilson Of Missouri SPE Receives Chamber Of Commerce Service Award

Curtis L. Wilson, P. E., Dean of Missouri School of Mines and Metallurgy at Rolla, Missouri has been granted the Community Service Award of the Rolla Chamber of Commerce. Presentation was made at a meeting of the Chamber on July 25, 1951 by Maurice E. Suhre, P. E., president of the Chamber, and himself a registered professional engineer.

The Community Service Award is made by the Chamber of Commerce from time to time to these citizens of Rolla who have made outstanding contributions to the welfare of the community without personal gain. Dean Wilson's was the 6th award that has been made during the past 15 years. The award, which was in the form of a plaque, read as follows:

"Be it known that the Rolla Chamber of Commerce does hereby express its appreciation for a decade of Community service rendered without thought of personal gain by

CURTIS LAWS WILSON

Civic leader, educator, public speaker, dean of the Missouri School of Mines and Metallurgy which has given Rolla prominence throughout the world as a center for the training of top ranking engineers; a figure of national importance in the field of mining and engineering education, who has still found time to promote public welfare in his own community where he is highly esteemed by his fellow citizens."

Dean Wilson is a registered professional engineer and long active in the National Society. He has been one of the leaders of Engineering Education in this country, having served as Chairman of the Mineral Industry Education Division of the American Institute of Mining and Metallurgical Engineers and is now serving his second 3-year term as the AIME Representative on the Engineers' Council for Professional Development and is a member of the ECPD Committee on Engineering Schools and Chairman of Region VI of that Committee.

Schulze Of Detroit Fatally Injured In Recent Auto Crash

Richard F. Schulze, a member of the Detroit Chapter of M.S.P.E., was fatally injured in an automobile accident while en route to his home in Troy, Michigan, the evening of June 26. Mrs. Kathrina Schulze, his wife who was driving with him, was seriously injured but was able to leave the hospital to attend the funeral services in Rochester on June 30. Burial was in Cadillac Gardens East Mount Clemens.

Mr. Schulze, who was born in Dresden, Germany, came to this area in the 1920's after obtaining his engineering degree in Germany. He was president of the firm of Schulze and Burgess of Hazel Park. In addition to being a member of the Michigan Society, Mr. Schulze was a member of the American Society of Tool Engineers.

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Point Four Without Government

(*Continued from page* 10)

that the relative efficiency of native labor does not balance with the relative real wages paid to them when compared with American standards. Some of this has been due to their living conditions, types of diets and complete lack of know-how in handling even the simplest tools. In most cases we have found the labor ready and willing to be trained.

Many of the foreign engineers have excellent theoretical training but completely lack practical experience. It seems to have been the European tradition that engineers are supervisors and purely white collar men, and this feeling has pervaded other parts of the world as well, so that it takes a while for many of the local engineers to do what is considered a satisfactory job.

On the other hand, we have found quite a few of the younger engineers in Latin America who have jumped at the chance to get practical engineering and manufacturing experience and who have done excellent jobs, both on construction work and in manufacture.

As a side light, we might mention that in reinforced concrete work Latin America is outstanding because that is the construction material with which they have worked. Skyscrapers, industrial plants—in fact, almost any kind of construction job can be engineered and erected in South America without much difficulty if reinforced concrete is used. In steel plant construction work they have used reinforced concrete in places where it might cause trouble within a few years. Of course, one of the major reasons for this is that structural steel has been so expensive as to be prohibitive in cost, and until they have local production of large sections at reasonable costs, none of their construction engineers will have any experience in structural steel design work.

It is also necessary to provide proper and adequate housing, feeding and recreational facilities for Americans who have to live not only in out of the way places but sometimes in fairly modern cities. This is a must. and these facilities should be provided before the Americans arrive.

One more point before I take up factors in which the individual engineer is perhaps most concerned, and that is: special care must be used in choosing the American construction and operating personnel being sent abroad. In the case of construction work for relatively short periods, it is advisable to discourage the Americans from taking their wives abroad; but, of course, some engineers will only go abroad with their wives, and if the wives can stand up under the experience, it is all right.

So far as the individual engineer is concerned, what are his prospects of working abroad? Broadly speaking, there would be two major possibilities. In the first instance, he will usually be employed by an American company and work through a foreign subsidiary or associate company, and he may or may not go out on a contract basis. This particular possibility does not offer many complications so long as he and the company both understand all of the circumstances involved.

The other possibility is to make an individual contract with the foreign company, and in that case he will want to check all aspects of the proposed contract to insure himself against any difficulties developing which might react unfavorably against him when he is on the job.

A foolish consistency is the hobgoblin of little minds.

—Emerson

He will have to consider that the customs and living habits vary from country to country, but they all differ from those in the United States. Unless a man is willing to adjust himself to these local conditions, he will have a difficult time doing a satisfactory job abroad, whether he works for an American company or a foreign company.

This is even more of a problem for his wife and family, unless they are very adaptable, because the man has his regular work to do which theoretically keeps him busy during the day and thus out of trouble. But the wife and family are constantly encountering strange conditions and can easily break under the strain, become naggers and gripers and destroy the man's efficiency.

There is another common fault which is frequently accented on foreign work—what we usually call "keeping up with the Joneses"—again with the family more likely to exhibit the characteristic than the individual man.

On a relatively long assignment where a cross section of a manufacturing organization or construction organization is involved, wives and families who might have no contact whatsoever in this country are brought into much closer contact abroad, and the pressure is on to have everything exactly the same as the boss's wife, even though the bank account says "no" and even if in the United States there would be no such pressure.

When we as individuals go abroad, we are just as much ambassadors of the United States to these countries as are our diplomatic representatives. As a matter of fact, our influence is even greater because we come into contact with the ordinary men in the streets within that country, and what we do or say is considered by those we meet as typical of every American citizen. It is problematical whether most of our movies do a good job abroad in presenting American life to our friends, and, unfortunately, many of the individuals who go abroad are no great help either in that respect.

In connection with living conditions, many Americans have gone abroad to work and have returned to the United States before the expiration of their contracts, even where they had the best of living conditions within the country in question. For instance, when the Brazilian National Steel Company was built some ninety miles from Rio, a beautiful town site was selected, nice homes, hotel and stores were available. But many of the Americans on the job tossed in their hats after just a few months.

We helped the Mexicans build a steel plant during the war, which, incidentally, shipped plates back to the United States Gulf ports for use in our shipyards before the end of 1944. The living conditions in Mexico on that particular assignment were much poorer than in Brazil, and we had some personnel troubles, but the turnover was much less than in Brazil and the plant was operating two years before the Brazilian plant, even though our work started one year later than theirs. So it isn't all a question of just living conditions.

The whole family must have the spirit of adventure and adaptability to local conditions to make the overseas job a real success.

The individual supervisor should certainly learn the foreign language involved to do an effective job. This is particularly true if he is to be on the job for an extended period. Certainly, interpreters can be obtained. But even at best, interpreters complicate matters and slow down the job. In many instances they set themselves up as "little bosses" and issue orders

(*Continued on page* 30)

"What They're Saying"

(*Continued from page* 17)

rotating schedule established by the committee. The yield in better-trained engineering graduates would be well worth the effort.

We owe it to our future engineers, who are now students, to prepare them adequately for the tasks that lie ahead of them—altruistically for their successful futures, and selfishly for our own progress and prosperity. Let us give them this training. Let us prevail upon the deans and faculties of our respective colleges and universities to initiate the necessary action and let us give them the real cooperation they will need in making the Industrial Training program successful.—*D. S. Kellogg, Chief Engineer, Maxson Engineering Division, W. L. Maxson Corporation, New York.* ·*Mechanical Engineering, July,* 1951.

THE REALIZED DREAM

Engineering registration is certification by the state that a practitioner has met at least the minimum educational and experience requirements set up by law to practice the engineering profession. The practitioner may be qualified far above the minimum but the state does not undertake to recognize degrees in qualification.

During the period in which registration laws were being passed, many questions were raised as to legality, desirability from a professional point of view and feasibility of enforcement. Time has answered all these questions. The legality is based upon the police power of the state to protect life, health, safety and property. This is a very old power assumed by government almost as soon as government was organized and certainly assumed along with its power to protect itself. The state has a right to do anything necessary to protect itself and protect the lives of its people, the health of the people, their safety, and of course, to protect their property.

When the Constitution was written the states retained the police power for themselves and only gave the Federal Government such powers as were necessary for specific tasks; their own powers to protect their citizens were not changed or abridged. Almost the first question asked by the neophyte is: "Why not pass a Federal law instead of all the state laws?" The reason has just been stated; the Federal Government was not given the needed police powers for this purpose.

The desirability of registration laws has been debated by engineers since the turn of the century. Always there have been two sides to the questions but the affirmative side has won. In the early days the opponents were the unqualified and the well qualified, while the proponents were usually the large group of engineers in between the extremes. The unqualified did not want to be left out; the well qualified were doing well without a law.

Some have said that registration was not feasible because of many bogie difficulties. Engineering could not be a profession because it had not relation of confidence; engineering covered such a wide range of activities that it was practically impossible to write a definition and finally, if a law were passed it could not be enforced. Engineering does have a relation of confidence; it can be defined and the laws can be enforced. Laws have been passed in all the states, the District of Columbia and the territories of Hawaii, Puerto Rico and Alaska.

What has been achieved by Engineering Registration? First, certain local problems have been solved. There has been a great growth towards unity in the profession. Registration has had its part; it may not have been the prime mover in the unity but at least it is one activity in which all engineers may engage. They can take an active part in seeing that only competent persons are registered and seeing that only competent practitioners are in the field.

Those of us who have been in the movement believe that we have better public understanding. The state has recognized the profession as having legal status. As a result, the people in the state understand better the difference between a professional and a non-professional. Of course, this same objective is being promoted by the Technical Societies and the National Societies throughout the states and through their local branches.

It has set up a definition of professional status—graduation plus four years' experience—or eight years' experience with an examination. This type of qualification is becoming the minimum for recognition of professional status.

There has been a strong incentive for self improvement in borderline cases. Written examinations have been required. There have been a number of repeaters who finally passed the examination. This has meant home study, extra courses, and coaching to get an improvement in their educational background. Certainly the competent have not been injured and the beginners have been improved.

The movement has swept the whole country. It began in Wyoming and ended in the adjacent state of Montana; all the other states having passed laws during the period. We are no longer in the beginning of the registration movement but probably nearing its noontide. The next great step will be to improve the registration laws, to get better enforcement; to make the laws apply to all practicing engineers and to make it easier for engineers to pass from state to state.—*N. W. Dougherty, Dean of Engineering, University of Tennessee. Journal of Engineering Education,* 1951.

Point Four Without Government

(*Continued from page* 29)

which may be quite at variance with the original instruction given to them, and it may be weeks or months before this is discovered.

This lack of language and the necessity for interpreters can also cause difficulties during negotiations or conferences, where at times the interpreter uses his imagination instead of sticking to the facts of the case.

Construction and technical work abroad can be, and is, sucessfully done on the same general basis as in this country, when proper consideration is given to the additional complications introduced by the foreign activity. In other words, thorough planning, good organization and equipment, and proper execution will do the assignment, and every job properly done will help us overcome Communism, our No. 1 enemy, and contribute toward the establishment of a better world for future generations.

"Brain Power"

(*Continued from page 7*)

without the latter there would be no reason or excuse for the former.

However, this can be no hare and tortoise race. Once you are out in front you must stay in the lead. With the manpower and the resources that the Russian controlled countries have, any time they get in front they win the race. Not only must we stay in front but by the same relative margin, in order to make up for any superiority in numbers and natural resources they have.

Russia has a great respect for this margin. For some time she has been testing it anew to find out the actual superiority of productivity over shear numbers. At one time this year the reported losses in Korea gave the ratio as 100 to 1. Perhaps Russia will try out other combinations to learn whether or not there is a ratio that will warrant an allout war on her part. What that is, of course, I do not know but I am confident that today we have the superiority that will win if a showdown becomes necessary. Our problem from here on is to keep that winning superiority and enough besides to remove the threat of war.

Productivity is the job of getting more with what you have. It means better methods, better machines, substitute materials to take the place of those in short supply, reduction of waste and the application of scientific discovery. And while we are finding out how to make better use of what we have, we are making more of it available for the expenditure of an hour of labor.

Productivity is the foundation on which our national defense rests. It is the basis for our American standard of living. It is the only way in which inflation can be kept in check. The engineer is the man to whom we must look for the technique, the methods, the know-how. That is a big job and it is getting bigger all the time. For that reason men are needed who have a breadth of concept and who can think and think big.

Engineering basically is the application of scientific knowledge. Engineering, however, because it lives in the realm of practicality, does not and cannot have the exactness of science.

Let me tell you about the first line of television sets my company put on the market. Our engineers had gone all out to make it as near perfect as possible, and it was—when it worked. Unfortunately, in the exactness of their design the engineers had not given consideration to the fact that television sets had to be assembled, packed, shipped, installed, serviced and used by human beings. Since there was little tolerance to compensate for this situation, faulty operation appeared. As soon, however, as the over engineering was corrected in the light of every-day production, installation and operating conditions, the troubles disappeared.

Engineering for industry of necessity is a compromise. For the most part our problems involve the weighing of a great many factors and conditions. If it were possible to have a single answer then our engineering problems would be simple because then we could design a computer to do all of our engineering work.

Let truth and falsehood grapple; whoever heard of truth being put to the worse in a free and open encounter.

—John Milton

Seldom is there one and only one correct answer. As a rule there is a choice of directions to take and it is even possible at times to have solutions that appear to be almost 180 degrees apart. Because this is the case industry wants men who are broad enough in their thinking to see all the possibilities and sound enough in their judgment to give them their proper weight.

For years engineering school faculties have asked industry what it wanted in the educational program. It has been a sincere search and just as sincerely industry has said to train the boys in the fundamentals. Industry still says this, but I am not at all sure that industry has made it clear, or that our engineering schools have always understood what was meant by fundamentals.

Too often, I am afraid, this has been taken to mean the mathematics and scientific principles of the particular brand of engineering. Such a narrow interpretation gives rigidity to instruction and restricts the student's thinking at a time when he should be expanding his outlook. Of course, not all schools hold to the narrow interpretation. The more progressive ones have shown an understanding of the needs of men who will go into industry by offering them a balanced curriculum.

I have heard it said, as I am sure you have, that there is a noticeable tendency among engineers to become introverts. As an example of this tendency, it is pointed out that engineers fraternize more with other engineers and are more shy with other members of the public. How much of this there is I do not know, but there is enough at least to have made it noticeable.

It would be difficult for me to believe that engineering attracted introverts, but I can understand how men who have not had a broad education, and who, by the very nature of their work, are not forced to have many public contacts, can have somewhat restricted social interests. This to me does not signify any inferiority complex as attaching to the profession but rather reliance for social contacts in a narrower area of compatibility.

Men in other professions such as law, medicine, and the ministry, are, by the very nature of their work, thrown constantly into close personal contact with lay people. Their interests have to be those of the people they work with and for. Engineers, on the other hand, are not so often required to sit down with lay people. That they fraternize more with birds of the same feather is understandable, particularly if their education was restricted to a narrow interpretation of fundamentals.

Industry would be much better served by engineers who have the interest to grow outside the boundaries of their profession. Stimulation of this interest, of course, can and does take place frequently after the men have left school and are on the job. It seems to me, though, that more could be gained by orientation in the early years of schooling. The idea is not new but, I am afraid, the practice is too often perfunctory, especially if the sessions are conducted by someone who knows the words but not the music.

Those of us who have had a diversified experience in industry can see a great many opportunities for engineers. How much better it would be if engineering students saw these in their early undergraduate years so they could make better choices in their electives. Can it be that the declining enrollment in engineering schools is a reflection of a growing public feeling that engineering offers less opportunity than other occupations?

The nice thing about engineering is that it *does* have so many opportunities, more opportunities as a rule than there are experienced men to fill them. My company, for instance, is a large employer of engineers but we are constantly hard pressed to find enough management men for our expanding production facilities. This year we expect to start construction or put into operation new factories in nearly a dozen different places. Not only

does our industrial relations department keep close watch on men of promise within the company but it refuses to permit men who are ready for larger responsibility to be held back by supervisors who are reluctant to give them up. Nevertheless, it is not easy to find the kind of men we want for the more important jobs.

The men we want most are those who have a deep respect for hard, honest work and an abiding faith in the justice of the rewards that come from such work. We need young men who have a mature outlook with respect to occupational integrity and a realization that they are no longer children who have a right to be cared for, but are now men who must be worthy of their hire. We want men capable of growing and becoming leaders. We want men who can adjust themselves to changing conditions without losing vision. We want men who are flexible enough to accept new ideas, yet so rigid in their principles that they will not shirk responsibility or lose any of their incentive to reach their goals.

Here are some fundamentals, it seems to me, that are just as important as the basic theory of electricity or an understanding of differential equations.

As you can see, we are looking for engineers who can grow and we expect to get them. By no means are we as discouraged as a friend of mine who, after discussing industry's needs all one afternoon, was asked by a college president what the colleges could do differently. His reply was, "well at least you can teach them to read and write."

MAYBE that was a little harsh, but I can say "Amen" to the writing part and add speaking, as well. It does not do a man much good to have ideas if he cannot make somebody else understand what is in his mind. Until thought transference, or mental telepathy is perfected, I am afraid we must rely on the normal means of communication.

Engineering manpower for industry, as I have tried to show, is not a subject that can be discussed entirely quantitively. There is a quality angle as well. A quantity deficiency is no more serious than a shortage of some critical materials. Ways will be found to use what we have more effectively. Supply will be increased wherever possible and substitutes will be sought. A deficiency in supply of men qualified to grow into important positions is a much more serious matter and one that should concern us not only for the moment, but for the future. Surveys have been made of the number of men graduating from engineering schools each year and the number still to graduate. Do we know nearly as well how many engineers are needed?

What is normal? Are our schools geared for that figure or are they geared to carry a peak load? Is it, for financial reasons, a temptation to take in all the students that can be accommodated without thought for the employment opportunities for graduates?

When colleges take in too many for the demand, the pay drops and until fairly recently, engineers as a whole were not well paid. When the supply is more than adequate more men get pushed into blind corners where opportunity ceases to exist. Too many engineers make employers careless of their use.

The strongest principle of growth lies in human choice.

—George Eliot

Right now, and for several years, the number of men graduating from engineering schools will be considerably less than before. In numbers they apparently will not be enough and something else must be done to make up the deficiency. The concern of industry will be whether the classes of the next few years will make up in quality what they will lack in quantity. With fewer students the engineering schools should be able to give more attention to the individual and perhaps more time to counsel with him, and inspire him. It is true that with very small classes almost anybody who graduates can get a job. It is equally true, however, that should such conditions last more than a year or two, as it appears they will, the need for especially well-trained men will be greater than ever.

EMERGENCY caused manpower shortages, such as we have today, can be solved by emergency measures, whether it be mechanics or engineers. Shortages which spring from other causes should be studied to find out why they exist and measures taken to remove the causes.

Only let us be sure, before we start building back too far, we know how many are needed. Let us be sure we know what the men are being trained for and that the work cannot be done as well or better by someone who has not had a formal education.

In other words, let us know what we are doing from here on in, and why.

Robbins and Dresser To Attend NCSBEE Annual Meeting

The Thirtieth Annual Meeting of the National Council of State Boards of Engineering Examiners will be held at Boston on October 21, 22, 23 and 24 at the Hotel Statler.

NSPE President L. L. Dresser and Executive Director Paul H. Robbins expect to attend the convention as official representatives of the National Society.

The convention will open on Sunday, October 21 with registration going on until early afternoon, followed by a sight-seeing tour. Delegates to the convention will see many historic Boston landmarks, and pass by such points of interest as the Massachusetts Institute of Technology and Harvard University. Sunday evening will be devoted to a State Board Secretaries Conference.

Monday's activities will include a group meeting of delegates from zones of the National Council, a Board of Directors meeting, and a meeting of all Standing Committees. The evening's entertainment will be furnished by Massachusetts members.

Business sessions and the Annual Banquet will take place on Tuesday, and a Business Session, Round-table discussion and Board of Directors meeting will close the convention.

The sublime and the ridiculous are often so nearly related that it is difficult to class them separately. One step above the sublime makes the ridiculous, and one step above the ridiculous makes the sublime again.

—Tom Paine

Professional Engineers of North Carolina—Summer Meeting. August 3 and 4. Atlantic Beach, Morehead City.

West Virginia Society of Professional Engineers—Annual Meeting. August 24 and 25. White Sulphur Springs.

New Jersey Society of Professional Engineers—Shore Dinner and Semi-Annual Meeting. September 8. Manasquan River Golf Club, Brielle.

Missouri Society of Professional Engineers—Annual Meeting. October 18, 19 and 20. Statler Hotel, St. Louis.

Board of Directors, National Society of Professional Engineers—Fall Meeting. November 9 and 10, Kansas City.

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Zsuffa of Georgia Society Assumes New Military Post

Leslie F. Zsuffa, Director of Public Relations at the Georgia Institute of Technology, Consulting Engineer of Atlanta, Ga., and member of the Georgia SPE, has been recalled to active military duty with the rank of Lieutenant Colonel to assist in the design and construction of a $11,000,000 Quartermaster Research and Development Laboratory to be constructed at Natick, Mass.

Granted a military leave of absence by Georgia Tech and the Board of Regents of the University System of Georgia in order to accept this military assignment, Mr. Zsuffa will serve in the Office of the Quartermaster General, Washington, D. C., as Executive Secretary of the Quartermaster Laboratory Design Committee.

A reserve officer, he was called to active duty prior to the outbreak of World War II and served three years as a staff officer at Headquarters of the 2nd Service Command, Governors Island, N. Y. During the following years, Colonel Zsuffa was on General Dwight D. Eisenhower's staff at SHAEF serving as a Supply and Engineering Officer, both in London and is Paris.

In addition to working on plans for D-Day, he also acted as liaison officer between SHAEF and the British and French ministries, and in the fall of 1944, when Prime Minister Churchill organized a special committee to investigate civilian conditions in France, Belgium and Holland, Zsuffa was assigned to assist the committee.

Everything that deceives may be said to enchant.

—Plato

Industrial Engineering Officer with the Readjustment and Production Divisions during 1944-45, Colonel Zsuffa was responsible for the design and construction of various war plants and their eventual conversation to purposes of peace.

Having served on the special committee, under the direction of the Office of Secretary of Defense, which chose the site for the Quartermaster Research & Development Laboratory, Lieutenant Colonel Zsuffa will help now to build it.

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Reading Chapter Inspects Generating Station Recently

The Reading Chapter of the Pennsylvania Society met on June 13 at Kenhorst Fire Hall in Reading for a dinner meeting followed by an inspection trip of the Titus Generating Station, Metropolitan Edison Company.

The Reading Chapter recently won the "Ritchie Lawrie, Jr., Award" for having the greatest percentage increase in membership in the Pennsylvania Society.

Committee Listings

(*Continued from page* 14)

Young Engineers Committee
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Eugene M. Zwoyer, P.E.
P.O. Box 4053
Albuquerque, N. M.

Special Representatives

Engineers Joint Council's Labor Panel: C. T. Shoch, 2129 Walnut St., Allentown, Penna.

Special Representative to E.C.P.D. Committee on Ethics: Allison C. Neff, P.O. Box 170, Middletown, Ohio.

Special Representative to Committee on Unity of the Engineering Profession: Alex Van Praag, Jr., 253 South Park St., Decatur, Ill.

Special Representative to the Engineers' Joint Council Committee on Surveys: William H. Larkin, 50 Ausable Ave., Staten Island 1, N. Y.

Special Representative to the American Standards Association: Richard L. Higgins, c/o Department of Labor, 1 Exchange Place, Jersey City 1, N. J.

Special Representative to the Advisory Committee NCSBEE National Bureau of Registration: Walter Graf, City Hall, Lancaster, Ohio.

Special Representative to (1) Building Officials Foundation; (2) U. S. Chamber of Commerce—Construction Industry Advisory Council: Ritchie Lawrie, Jr., 321 North Front St., Harrisburg, Penna.